

April 15, 2016

VIA E-MAIL AND OVERNIGHT MAIL

Frank X. Cardello, Esq.
Assistant Regional Counsel
U.S. Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866

**Re: LCP Chemicals, Inc. Superfund Site
Response of IES to EPA's
Modified 104e Request for Information**

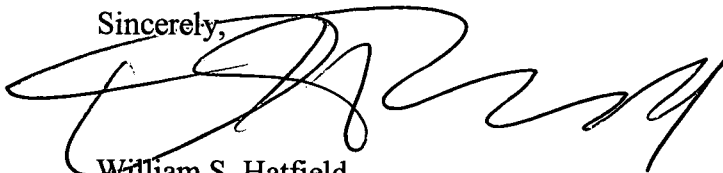
Dear Mr. Cardello:

As you know, this firm has been retained to represent ISP Environmental Services, Inc. ("IES") in connection with the LCP Site in Linden, New Jersey. Enclosed are IES's initial responses to EPA's Request for Information in the Matter of LCP Chemicals, Inc. Superfund Site dated January 29, 2016, as amended and modified by EPA's February 15, 2016 letter. As discussed and agreed, IES hereby makes its initial response to EPA's request based on the information available. Please be advised that IES will supplement its response after additional information is gathered and becomes available. IES also incorporates by reference its submissions to EPA in 2014 and 2015 related to the LCP site.

In the interim, please contact me if you have any questions concerning this matter.

Thank you.

Sincerely,



William S. Hatfield
Director

Enclosures: 104(e) Response via Email; Document Binder via Overnight Mail

cc: Thomas Carroll, Esq. - Department of Justice (Enclosure via Email, w/o Binder)

437424



**RESPONSE OF ISP ENVIRONMENTAL SERVICES INC. ("IES")
TO EPA'S MODIFIED SECTION 104(e) INFORMATION REQUEST IN THE MATTER
OF LCP CHEMICALS, INC. SUPERFUND SITE**

1. Provide copies of all casualty, liability and/or pollution insurance policies, and any other insurance contracts (including, but not limited to, Environmental Impairment Liability, Pollution Legal Liability, Cleanup Cost Cap or Stop Loss Policies, Institutional Controls and Post Remediation Care Insurance) that you maintain or have maintained may potentially provide, or previously has provided, insurance for bodily injury, property damage and/or environmental contamination in connection with the GAF and/or the LCP Linden Sites. Include, without limitation, all comprehensive general liability, primary, excess, and umbrella policies.

RESPONSE:

IES does not maintain any insurance policies that may potentially provide insurance for bodily injury, property damage and/or environmental contamination in connection with the LCP Site. Based upon information and belief, all insurance policies were maintained by GAF for the LCP Site. Any policies that IES (or others) may have maintained for the GAF Linden Site are not relevant to this matter. As advised, IES has requested that its former insurance counsel provide copies of the insurance policies, any settlements, and the files related to the LCP Site coverage from the prior insurance litigation. IES has not yet received the entire file. IES's investigation is ongoing and, upon completion of the investigation, IES will supplement its response to include any other information responsive to this 104(e) request.

2. If there are any such policies from Question 1 above of which you are aware but neither possess copies, nor are able to obtain copies, identify each such policy to the best of your ability by identifying:
- a. The name and address of each insurer and each insured;
 - b. The type of policy and policy numbers;
 - c. The per occurrence policy limits of each policy; and
 - d. The effective dates for each policy.

RESPONSE:

See response to Question No. 1.

3. Provide copies of all settlements with any insurer which relates in any way to environmental liabilities and/or to the policies referenced in Questions 1 and 2 above, including:
- a. The date of the payment or settlement;
 - b. The scope of release provided in connection with such payment or under such settlement;
 - c. The amount of money paid by the insurer.

RESPONSE:

See response to Question No. 1, and see Certification of Robin E. Lampkin, dated April 14, 2016, and Certification of Andrew Patz, dated April 14, 2016.

4. Provide copies of all communications by or on behalf of: G-1 Holdings Inc., GAF Chemical Corp., GAF Corporation or their successors or predecessors, or Ashland Inc., International Specialty Products, Inc., ISP Environmental Services, Inc. or their successors or predecessors, with any insurance companies that evidence, refer, or relate to claims made or costs incurred in connection with the LCP Linden Site under any insurance policy referenced in Questions 1 and 2 above. Include any responses from the insurer with respect to any claims.

RESPONSE:

See response to Question No. 1.

5. Provide copies of all reports, correspondence and other records and documents filed with or submitted to the U.S. Securities and Exchange Commission ("SEC") or its staff, and the SEC's responses thereto, referencing the GAF and/or the LCP Linden Sites or insurance claims for the GAF and/or the LCP Linden Sites.

RESPONSE:

See ISP's response to the separate information request sent to ISP.

6. Provide copies of all records and documents:
- a. prepared during the time period January 1, 1988 to December 31, 1991, that define, characterize, describe or otherwise explain the meaning of the following terms as those terms are used in the attached Exhibit A and Exhibit B:
 - i. "Chemicals Business" (See Exhibit A, Paragraph 4(i).)
 - ii. "Specialty Chemicals" (See Exhibit A, Paragraph 4(i).)
 - iii. "Linden Site" (See Exhibit B, Schedule of Liabilities and Obligations.)
 - b. prepared prior to January 1, 2012, that define, characterize, describe or otherwise explain the meaning of the term "Project Aware" as that term is used in the attached Exhibit A, Paragraph 4(iii) (B).

RESPONSE:

a.i. Available documents that define, characterize, describe or otherwise explain the meaning of the term "Chemicals Business" as used in Paragraph 4(i) of the 1989 Plan of Complete Liquidation, are attached as Exhibit A.

The referenced Plan of Complete Liquidation discusses the transfer of assets for GAF's then-ongoing chemicals businesses, which could not have included assets and liabilities associated with the LCP Site, as the LCP Site had been sold in 1972, and, moreover, LCP had ceased chlor-alkali manufacturing operations several years prior. Pursuant to the Plan of Complete Liquidation, Edgecliff received all of GAF's liabilities arising out of "environmental claims from plants no longer operating," such as the LCP Site. Under GAF's 1989 Plan of Complete Liquidation then, any and all liabilities associated with the LCP Site were transferred to Edgecliff, and not to Dorset. The allocation of liabilities between Dorset and Edgecliff is confirmed by the language of two additional documents executed on April 10, 1989 at the time of GAF's liquidation. In one of those documents, Edgecliff, not Dorset, assumed "100% of all liabilities arising out of . . . environmental claims from plants no longer operating," *e.g.*, the LCP Site. Instrument of Assignment and Assumption (Edgecliff) at ¶ 3(i)(C). By contrast, a separate agreement executed on the same day transferred to Dorset "environmental claims arising out of

plants currently operating in the Chemicals Business.” Instrument of Assignment and Assumption (Dorset) (April 10, 1989) at ¶ 4(i)(C).

IES’s investigation is ongoing and, upon completion of the investigation, IES will supplement its response to include any other information responsive to this 104(e) request.

a.ii. Available documents that define, characterize, describe or otherwise explain the meaning of the term “Specialty Chemicals” as used in Paragraph 4(i) of the Plan of Complete Liquidation are attached as Exhibit B.

The documents demonstrate the term “Specialty Chemicals” is limited to those chemicals manufactured by ISP at the time it was incorporated, which consisted of nine groups: vinyl ethers, polymers, solvents, intermediates, specialty preservatives, sunscreens, emollients, pearlescent pigments, and fine chemicals. *See, e.g.*, 1993 ISP 10-K, annexed to the Response of ISP as Exhibit A, at 1-2. Neither the chlorine nor the sodium hydroxide previously manufactured by GAF Corporation at the LCP Site before 1972 were manufactured by ISP, nor are they considered “Specialty Chemicals.”

The “manufacture and sale of specialty chemicals at Linden, NJ” did not include the former historical operation of the adjacent chlor-alkali plant at the LCP Site. In contrast, GAF Corporation’s historical operations at the LCP Site involved only the production of chlorine and sodium hydroxide, not “specialty chemicals.” *See* 1999 AOC. The products manufactured at LCP were not specialty chemicals, rather, they were commodity chemicals. Commodity chemicals, such as those raw materials historically produced at the LCP Site, are products universally manufactured by a large number of companies, typically in large volume with minimal product variation from producer to producer. As the chemicals manufactured at the

LCP Site were neither specialty chemicals nor among the types of chemicals manufactured by ISP, any assets and liabilities associated therewith, including those of the LCP Site, were neither transferred to, nor assumed by, ISP or its predecessor companies.

IES's investigation is ongoing and, upon completion of the investigation, IES will supplement its response to include any other information responsive to this 104(e) request.

a.iii. Available documents that define, characterize, describe or otherwise explain the meaning of the term "Linden Site" as used in the Schedule of Liabilities and Obligations are attached as Exhibit C.

The documents demonstrate that the term "Linden Site" referred to GAF Chemical's specialty chemical manufacturing facility in Linden, New Jersey, which was adjacent to the LCP Site and did not include the LCP Site.

In the 1991 Assumption Agreement, IES (then known as ISP 9 Corp.) assumed liabilities "relating to the manufacture and sale of specialty chemicals at Linden, NJ . . . including liabilities for the cleanup of the Linden site." The "Linden Site" referenced in the 1991 Assumption Agreement is the GAF Chemicals Site that is subject to the 1989 Administrative Consent Order ("ACO") with the New Jersey Department of Environmental Protection ("NJDEP") as amended, not the LCP Site. The only "cleanup of the Linden Site" to which the 1991 Assumption Agreement could have referenced is the NJDEP-supervised cleanup of the former GAF Chemicals Site (now owned by Linden Property Holdings, LLC ("LPH")), which began in 1989 under the supervision of the NJDEP. The EPA's federally-supervised investigation of the LCP Site did not begin until 1994, and the EPA did not even seek information from GAF and other potentially responsible parties until 1998, after the LCP Site

had been placed on the federal National Priorities List (“NPL”). Thus, the LCP Site was not included in the 1991 reference to “cleanup of the Linden Site.”

Similarly, in the 1989 Instrument of Assignment and Assumption, Dorset specifically received the liability for “Project Aware environmental clean-up costs.” Instrument of Assignment and Assumption (Dorset) (April 10, 1989) ¶ 4(i)(B). As discussed in further detail, *infra*, this too could only have been the ongoing NJDEP-supervised cleanup at the adjacent GAF Chemicals/LPH Site under the 1989 ACO, and not the adjacent LCP Site, which occupies a separate lot and was not listed on the NPL by EPA until years later.

The 1991 ISP Annual Report further demonstrates that the Linden Site does not include the LCP Site. The 1991 ISP Annual Report expressly defined the term “Linden Site” as “its plant in Linden New Jersey (the Linden Site),” for which it “entered into two Administrative Consent Orders” with the NJDEP. The former chlor-alkali plant at the LCP Site, which was sold by GAF Corporation decades before IES was formed, had ceased operations years prior to IES’s formation. The LCP Site was not part of the “Linden Site,” nor was it included in NJDEP’s ACO with GAF Chemicals or IES, which was known as “Project Aware.”

IES’s investigation is ongoing and, upon completion of the investigation, IES will supplement its response to include any other information responsive to this 104(e) request.

- b. Available documents that define, characterize, describe or otherwise explain the meaning of the term “Project Aware” as used in Paragraph 4(iii) (B). of the Plan of Complete Liquidation are attached as Exhibit D.

The documents demonstrate that the term “Project Aware” referred to GAF Chemical’s remediation efforts at its specialty chemical manufacturing facility in Linden, New Jersey under the 1989 NJDEP ACO, which did not include the LCP Site.

Aware, Inc., which was the name of an environmental consulting firm that later became Eckenfelder and is now a part of the Brown & Caldwell consulting firm, was retained by GAF Chemicals initially to construct the waste water treatment plant at its Linden, New Jersey plant in the mid 1980’s. During the course of the 1980’s, 1990’s and 2000’s, Aware, and its successor firms Eckenfelder and Brown & Caldwell, continued work for GAF Chemicals and IES in connection with the shutdown and remediation and redevelopment of the Linden site. Those efforts were initially known as “Project Aware.”

A 2009 memorandum from G-I Holdings Inc.’s counsel to the Department of Justice confirms that “Project Aware” meant the environmental cleanup activities at the Linden facility that GAF continued to operate after selling the LCP Site in 1972. See Corporate History Summary Regarding the Linden Sites (attached to Letter from Dennis J. O’Grady to David L. Gordon (April 2, 2009) at 2 (noting that after the 1972 sale of the LCP Site, GAF continued to own and operate “the Linden facility,” and that the term “Project Aware” meant the environmental cleanup activities at “the Linden facility”). Another GAF Corporation document refers to these costs as “Linden clean-up costs” and provides particularly relevant insight: GAF’s May 5, 1992 Lawson Memorandum (“Lawson Memorandum”) (“Specifically, the liabilities of Old GAF were distributed under the Plan of Liquidation” such that “GAF Building Materials Corporation (formerly Edgecliff, Inc.)” received “[a]ll liabilities arising out of . . . (b) plant shutdowns (any old GAF business) [and] environmental claims from plants no longer operating (any GAF business)).” The Lawson Memorandum also references “Linden clean-up costs,”

which in 1992 related to the 1989 ACO work and remediation of the adjacent site in Linden (now owned by LPH) under the supervision of NJDEP. See June 16, 1989 ACO. The “Linden cleanup costs” did not relate to the investigation or cleanup of the federally-supervised LCP Site.

IES’s investigation is ongoing and, upon completion of the investigation, IES will supplement its response to include any other information responsive to this 104(e) request.

CERTIFICATION OF ANSWERS TO REQUEST FOR INFORMATION

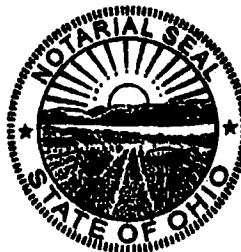
State of Ohio
County of Franklin

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document (response to EPA Request for Information) and all documents submitted herewith, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete, and that all documents submitted herewith are complete and authentic unless otherwise indicated. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I am also aware that I am under a continuing obligation to supplement my response to EPA's Request for Information if any additional information relevant to the matters addressed in EPA's Request for Information or my response thereto should become known or available to me.

Robin E Lampkin
NAME
Senior Group Counsel
TITLE
Rob E Lampkin
SIGNATURE

Sworn to before me this 15th
day of April, 2016

Wendi M. Hunter
Notary Public



Wendi M Hunter
Notary Public, State of Ohio
My Commission Expires 12-13-19

CERTIFICATION OF ANDREW PATZ

1. I am President of EHS Support LLC, an environmental, health and safety consulting firm that provides services in many areas, including remediation management, due diligence for M&A transactions, and assessment of EH&S compliance.
2. I received by B.S. in Environmental Science/Geology from Slippery Rock University in 1997, and my M.S. in Environmental Science and Management from Duquesne University in 2005.
3. I submit this Certification on behalf of ISP Environmental Services Inc. ("IES"), a wholly-owned subsidiary of Ashland Inc. ("Ashland") in response to the Environmental Protection Agency's January 19, 2016 104(e) Request for Information, as amended on February 25, 2016 for the LCP Chemicals, Inc. Superfund Site in Linden, New Jersey.
4. EHS Support LLC was retained by Ashland to provide environmental support and facilitate the due diligence process as part of a transaction through which Ashland Inc. acquired International Specialty Products Inc. ("ISP") and its wholly-owned subsidiaries, including IES, from the Heyman family (the former shareholders of ISP) through a stock purchase agreement in 2011.
5. As part of the stock purchase transaction for International Specialty Products, Inc. with the Heyman family, we made an inquiry on behalf of Ashland as to available insurance proceeds that ISP or IES had obtained in settlements with the GAF Corporation's ("GAF") insurance carriers that could be used to satisfy claims or future costs for any ISP or IES environmental liabilities.
6. During a due diligence conference call with representatives of the Heyman family on April 21, 2011, the Heyman family disclosed that the total sum of insurance recoveries collected from litigation with the carriers from 2007 through 2010 was \$46.9 million for all sites. This sum was collected by GAF and ISP in various settlements. The Heyman representatives on that call were Jason Pollock, Esq., Celeste Wills, Esq., Jared Durmont and Nick Cronas.
7. The ISP Chemco LLC Consolidated Financial Statement for 2010 stated that those insurance recoveries were believed to be in excess of the current estimated liability for all Environmental Claims.

8. We asked the Heyman representatives whether the Consolidated Financial Statement meant that the funds obtained through insurance recoveries were available to address any IES or ISP environmental liabilities or costs.
9. When asked about the status of these insurance recoveries during the April 21, 2011 call to evaluate if insurance recoveries could potentially be used to address existing environmental liabilities, Jason Pollock, then Senior Vice President and General Counsel of ISP, stated that the insurance monies were “fungible” and that no reserve had been set aside.

I hereby certify that the foregoing statements made by me are true.

A handwritten signature in black ink, appearing to read 'A. K. Patz', with a large, stylized flourish at the end.

Dated: April 15, 2016

Andrew K Patz

CERTIFICATION OF ROBIN E. LAMPKIN

1. I am Senior Environmental, Product Regulatory & Trade Group Counsel at Ashland Inc. ("Ashland").
2. I received my J.D. from the Ohio State University Moritz College of Law in 1989.
3. I have worked for Ashland in various legal positions since December 1991.
4. I submit this Certification on behalf of ISP Environmental Services Inc. ("IES"), a wholly-owned subsidiary of Ashland, in response to the Environmental Protection Agency's January 19, 2016 104(e) Request for Information, as amended on February 25, 2016 for the LCP Chemicals, Inc. Superfund Site in Linden, New Jersey.
5. As part of the 2011 stock purchase transaction for International Specialty Products, Inc. with the Heyman family, we made an inquiry on behalf of Ashland as to available insurance proceeds that ISP or IES had obtained in settlements with the GAF Corporation's ("GAF") insurance carriers that could be used to satisfy claims or future costs for any ISP or IES environmental liabilities
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7. The ISP Chemco LLC Consolidated Financial Statement for 2010 stated that those insurance recoveries were believed to be in excess of the current estimated liability for all Environmental Claims.
8. We asked the Heyman representatives whether the Consolidated Financial Statement meant that the funds obtained through insurance recoveries were available to address any IES or ISP environmental liabilities or costs.
9. When asked about the status of these insurance recoveries during the April 21, 2011 call to evaluate if insurance recoveries could potentially be used to address existing environmental liabilities, Jason Pollock, then Senior Vice President and General Counsel

of ISP, stated that the insurance monies were "fungible" and that no reserve had been set aside.

10. In preparing IES's response to EPA's amended 104(e) request for information related to the LCP Chemicals, Inc. Superfund Site, I have personally performed a diligent search of available accounting records to assist in the determination of how IES accounted, managed or utilized any insurance proceeds recovered relative to the LCP Chemicals, Inc. Site. My preliminary investigation indicates that these funds were deposited in various bank accounts of ISP, Building Materials and G-I, and were subsequently used to pay expenses, address liabilities of those businesses, and were transferred throughout the organization for various purposes, including but not limited to inter-company loans, transfers, and payments to officers and Heyman family members during the timeframe that the Heymans controlled these companies, before Ashland acquired ISP and its wholly-owned subsidiary IES. Any benefit from the receipt of insurance proceeds was taken by the Heyman family and its related companies prior to Ashland's acquisition of ISP. This also supports, and is consistent with, the aforementioned representations made by Jason Pollock during the April 21, 2011 due diligence conference call. This investigation is ongoing and IES's response to this request will be supplemented when the investigation is complete.

I hereby certify that the foregoing statements made by me are true.

Dated: 4-15-2016


Robin E. Lampkin

Exhibit A

AND ASSUMPTION

INSTRUMENT OF ASSIGNMENT AND ASSUMPTION, dated as of April 10, 1989, by and among GAF Corporation (the "Corporation") and Dorset Inc. ("Dorset"), both Delaware corporations (the "Instrument").

WHEREAS, the holders of all the outstanding shares of capital stock of the Corporation entitled to vote thereon have adopted and approved a Plan of Complete Liquidation of the Corporation (the "Plan");

WHEREAS, Dorset owns 87.43655% of the capital stock of the Corporation;

WHEREAS, pursuant to the Plan, the Board of Directors of the Corporation has determined to effect the distribution and transfer of all of its assets and liabilities to all of its stockholders;

WHEREAS, pursuant to the Plan, the Corporation has filed a Certificate of Dissolution in the state of Delaware;

NOW, THEREFORE, in consideration of the premises and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto take the following actions:

1. The Corporation hereby transfers, conveys, sets over and assigns to Dorset:

(1) all the assets and liabilities, known and unknown, relating to its acetylenic chemicals, surfactants, specialty chemicals, organometallics, mineral products, industrial filters and filter vessels businesses (collectively, the "Chemicals Businesses"), including but not limited to: (A) all the outstanding stock of GAF Chemicals Corp., General Aniline and Film Corp., GAF Realty Corporation, GAF International Corporation, Ludlow Inc., Bluehall Inc., Mossbank Inc., Alkaryl Chemicals Ltd. (Canada), GAF (Australasia) Pty. Ltd., GAF (Belgium) N.V., GAF do Brasil Industria e Comercio Ltda, GAF (Canada) Inc., GAF (Deutschland) GmbH, GAF (France) S.A., GAF Freight Services N.V. (Belgium), GAF (Great Britain) Co. Ltd., GAF (Hong Kong) Limited, GAF Insurance Ltd. (Bermuda), GAF (Italia) S.r.l., GAF (Japan) Ltd., GAF Corporation de Mexico, S.A. de C.V., GAF (Norden) A.B., GAF (Osterreich) Ges.m.b.H., GAF Sales (U.K.) Limited, GAF (Singapore) Pte. Ltd., GAF (Switzerland) A.G., GAF (U.S. Virgin Islands), Inc., and all the shares of GAF-Huls Chemie GmbH held by the Corporation; (B) all right, title and interest of the Corporation in and to all the technologies and trademarks and tradenames used by the Corporation relating to the Chemicals Businesses, including, but not limited to the patents and trademarks listed in Exhibit A attached hereto; (C) all the Corporation's real property interests listed in Exhibit B attached hereto;

(ii) notwithstanding any other provision of this Instrument, all its trademarks or tradenames that contain the name "GAF", including, but not limited to those contained in Exhibit C attached hereto (to the extent owned by the Corporation); and

(iii) all of its assets, known or unknown, not otherwise transferred, conveyed, set over, or assigned or assumed under this Instrument or under Instruments of Assignment and Assumption of even date herewith between the Corporation and one or all of its stockholders (collectively, the "Other Instruments"), including, but not limited to, any land, leases, buildings, real property, plant, equipment, inventory, contract rights, receivables, trademarks, intangibles, discontinued products and other assets.

2. Dorset hereby undertakes, assumes and agrees to perform, pay or discharge all of the duties, obligations and liabilities of the Corporation with respect to (and to defend, indemnify and hold harmless the Corporation from and against all losses, liabilities and expenses, including legal fees and court costs, suffered or incurred in connection with) the assets and liabilities transferred, conveyed, set over or assigned to it under paragraph 1 above.

3. Notwithstanding any other provision of this Instrument, Dorset shall not assume and shall not be liable for

any liabilities, costs, fees and expenses, known or unknown, arising out of any claims, lawsuits or other actions (A) seeking recovery for bodily injury, sickness, disease or death alleged to have been caused in whole or in part by any asbestos or asbestos-containing material whether in the work place or otherwise, (B) seeking to recover the cost of abatement, removal or replacement of asbestos or asbestos-containing material from any public, commercial or private building or other structure, including the cost of health screenings, inspections and operation and maintenance programs, (C) seeking the clean-up of asbestos or asbestos-containing material from any land fill, waste disposal or other site, and (D) any other liability related to the manufacture, sale or use of asbestos or asbestos-containing material, whether arising pursuant to a contractual agreement or under Federal, state or local law, ordinance, regulation, rule or common law (in contract, tort or otherwise) (collectively, the "Asbestos-Related Liabilities").

4. The Corporation hereby transfers, conveys, sets over and assigns to Dorset:

(i) 100% of the liabilities arising out of (A) the production of Amiben; (B) Project Aware environmental clean-up costs; and (C) environmental claims arising out of plants currently operating in the Chemicals Businesses (collectively, the "Specific Liabilities"); and

(ii) 87.43655% of its duties, obligations and liabilities, not otherwise transferred, conveyed, set over, or assigned or assumed under this Instrument or under the Other Instruments (all such duties, obligations and liabilities collectively the "Other Liabilities"), including, but not limited to, its liabilities (A) under the note issued by the Corporation to G-I Holdings Inc. on March 29, 1989 with a principal amount of \$5,170,300, (B) for workers compensation and medical benefits for retirees and former employees of discontinued operations, (C) for insurance claims arising with respect to the 1983-84 year during which the Corporation was self-insured, (D) for pension plan termination liabilities, (E) for the redemption of the Preferred Stock of the Corporation, and (F) for other legal claims, but excluding all Asbestos-Related Liabilities.

Dorset hereby undertakes, assumes and agrees to perform, pay or discharge all the duties, obligations and liabilities of the Corporation with respect to (and to defend, indemnify and hold harmless severally the Corporation from and against all losses, liabilities and expenses, including legal fees and court costs, suffered or incurred in connection with) 100% of the Specific Liabilities and 87.43655% of the Other Liabilities.

5. Dorset shall enjoy, to the fullest extent permitted under applicable law, the benefit of all insurance coverage of the Corporation in effect on the date of the adoption of the Plan.

6. The parties hereto hereby agree to execute and deliver such further instruments and documents as any party shall reasonably request to effect the foregoing transactions.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed the day and year first above written.

GAF Corporation

By

Dorset Inc.

By

BLANK DIVDER

CHEMICALS CORPORATION
ORGANIZATIONAL CHARTS
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Chem. 19-2	Texas City Plant	4-3-89
Chem. 19-3	Texas City Plant	1-1-89
Chem. 19-4	Texas City Plant	8-7-89
Chem. 19-5	Seadrift Plant	1-1-89
Chem. 19-6	Texas City Plant	1-1-89

CHEM. 1
OFFICE OF THE PRESIDENT
August 7, 1988

REPORTS TO
CHAIRMAN AND C.E.O.
SEE CORP. 1

President
Chemicals Corporation
HEINN F. TOMFOHRDE, III

Vice President
Finance

RICHARD OLSEN

Sr. Vice President and
General Manager-Acetylenes

DAVID BARTON

Sr. Vice President
and General Manager
Surfactants

FRANK E. SHEEDER, JR.

Vice President
Research & Development

JOHN TANCREDI

Vice President &
General Manager
Mineral Products

T.H. KING

Vice President
Mat. Mgmt. & Tech. Ser.

ABRAHAM LINDENAUER

Vice President
Human Resources

GERALD WHITMORE

Vice President and
General Manager
Advanced Materials

ART DRESNER

CHEM. 1-1
ACETYLENES
July 5, 1989

REPORTS TO
PRESIDENT - CHEMICALS
SEE CHEM. 1

Sr. Vice President and
General Manager - Acetylenes

DAVID BARTON

Vice President
Manufacturing - Acetylenes

RICHARD BORZELLI

SEE CHEM. 4

Vice President
International

RAYMOND SMITH

SEE INT'L. 1

Vice President
Marketing and Sales
Acetylenes

RICHARD BAUMANN

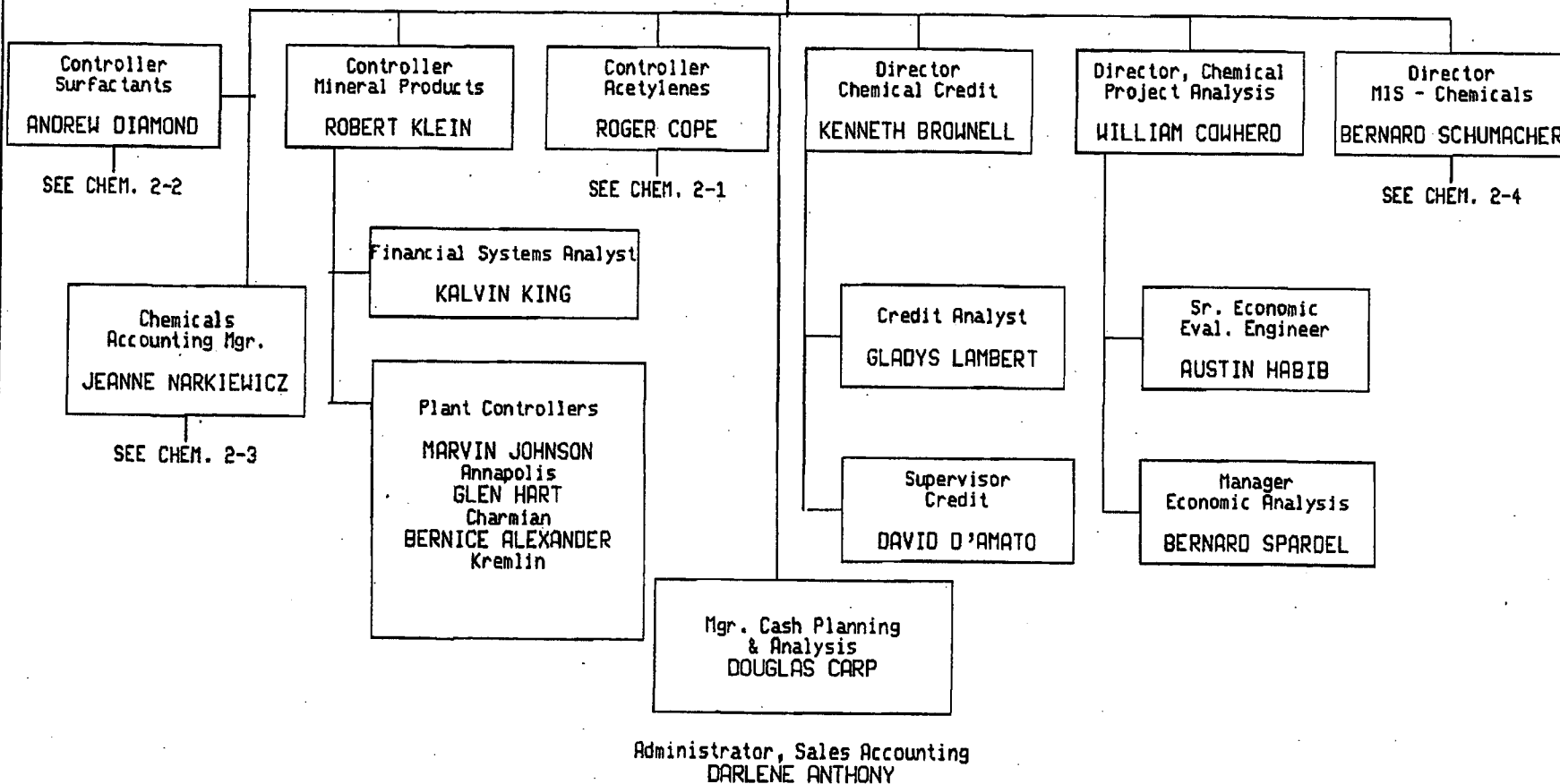
SEE CHEM. 3

CHEM. 2
FINANCE
October 1, 1989

REPORTS TO
PRESIDENT - CHEMICALS
SEE CHEM. 1

MANPOWER	
Exempt	66
Nonexempt	36
Hourly	20
Total	122

Vice President
Finance
RICHARD OLSEN



CHEM. 2-1
FINANCE
October 1, 1989

REPORTS TO
VICE PRESIDENT - FINANCE
SEE CHEM. 2

Controller
Acetylenes
ROGER COPE

Plant Controller
Calvert City
DONALD MYERS

Staff Accountant
DAVID NUTI

Supervisor, Gen. Acct.
JACK HEFLIN

Supervisor
Fixed Assets
MELISSA ORR

Accounting
Manager
RICHARD WRIGHT

Controller
Texas City
BUFORD HUDGINS

Fixed Asset
Accountant
W. SHELBY POWELL

Supervisor
Cost Accounting
RICHARD PFAB

Manager
Plant Accounting
JOHNNY JONES

Mgr. Financial
Analysis & Planning
DOUGLAS CARP

Finance Director
Europe
MICHAEL GREAVES

SEE INT'L 6-6

Controller
Int'l Filters
R. VAN ACKER

Director, Int'l
Finance
MIKE STRANO

Finance Director
Asia/Pacific
ROBERT WONG

SEE INT'L 6-6D

Controller
Brazil
CARLOS REIS

SEE INT'L 3-2

Controller
Western Hemisphere
DAN MATARAZZO

Controller
Mexico
SERGIO RIVERO

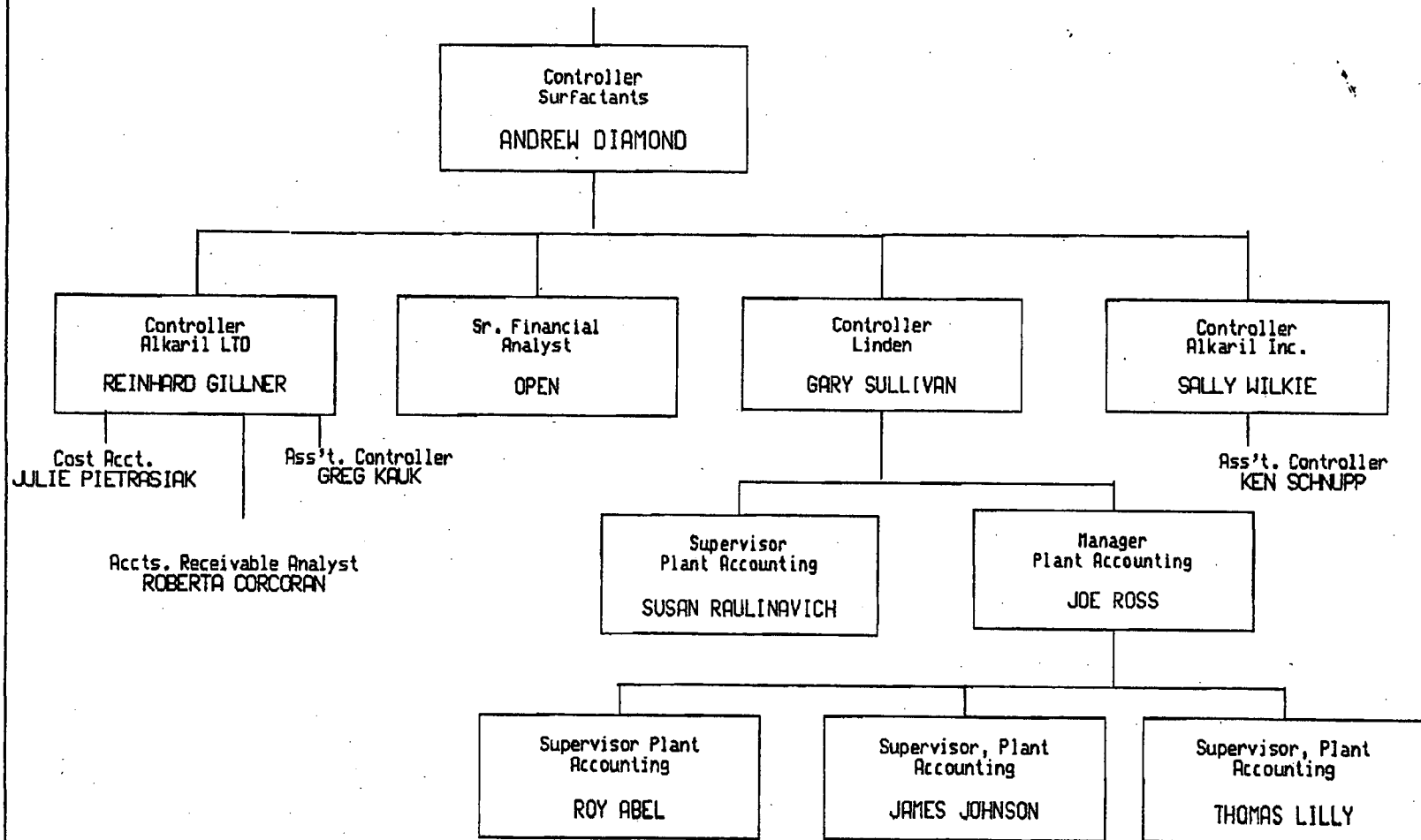
SEE INT'L 3-1

Controller
ANDREW GRIFFITH

SEE INT'L 3-3

CHEM. 2-2
ACCOUNTING & FINANCE
October 1, 1989

REPORTS TO
VICE PRESIDENT - FINANCE
SEE CHEM. 2



CHEM. 2-3
FINANCE
August 7, 1989

REPORTS TO
VICE PRESIDENT - FINANCE
SEE CHEM. 2

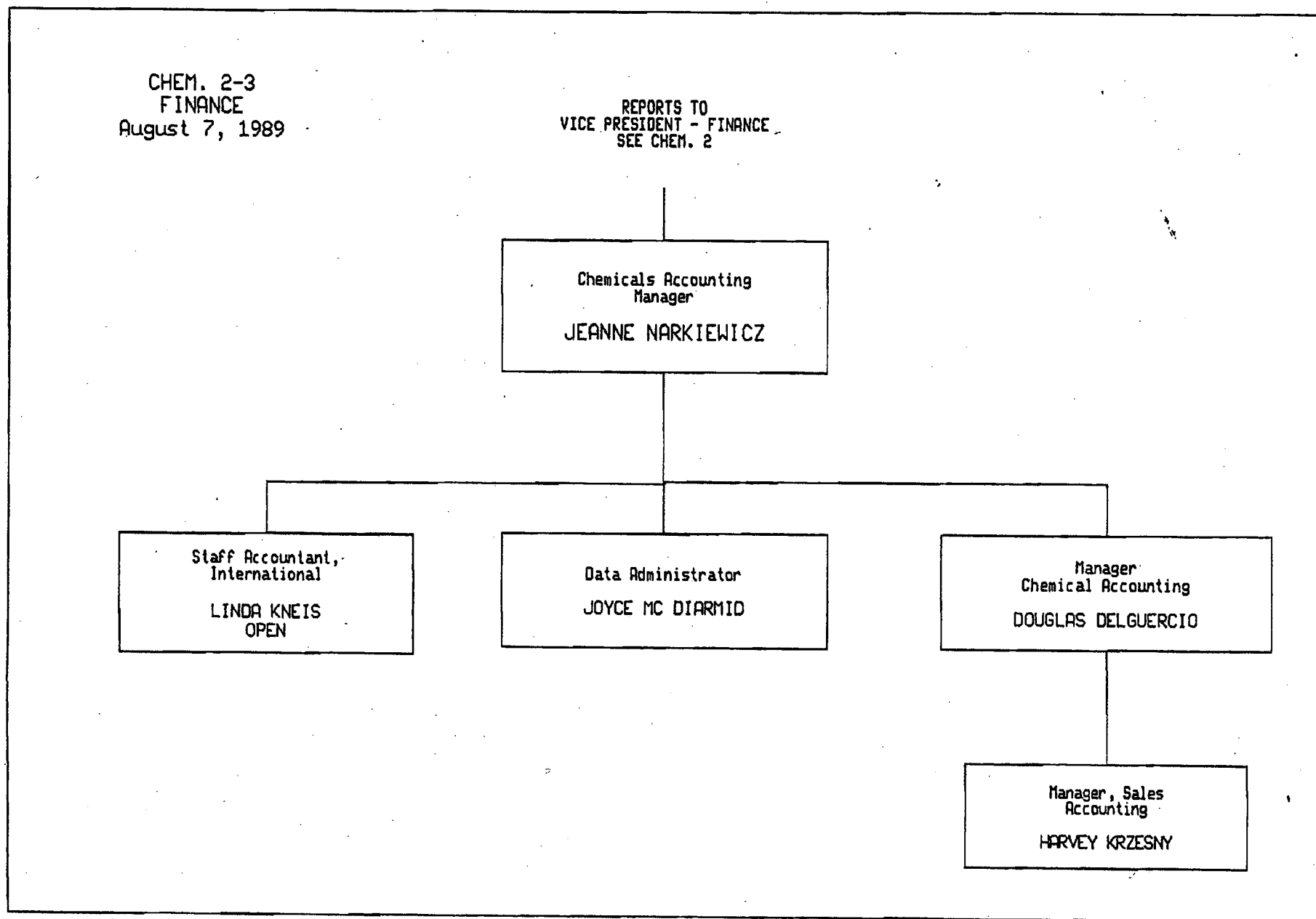
Chemicals Accounting
Manager
JEANNE NARKIEWICZ

Staff Accountant,
International
LINDA KNEIS
OPEN

Data Administrator
JOYCE MC DIARMID

Manager
Chemical Accounting
DOUGLAS DELGUERCIO

Manager, Sales
Accounting
HARVEY KRZESNY



CHEM. 2-4
FINANCE - M.I.S.
October 1, 1989

REPORTS TO
VICE PRESIDENT - FINANCE
SEE CHEM. 2

Director
M. I. S. - Chemicals
BERNARD SCHUMACHER

Manager
Int'l Systems
JOHN GONZALEZ

Mgr. Financial &
HR Systems
DAVID HARRISON

Manager, MIS
• Mineral Products
PETER GASPARO

Programmer/Analyst
ROBERT CASALE

Manager, MIS
Europe
LOUIS AELBRECHT

Systems Consultant
LINDA DEMAEYER

D.P. Coordinator
European Headquarters
C. BULLOCK

Programmer Analyst
S. THOMPSON

Systems Analyst
Asia Pacific
P. YAN CHOO

Systems Analyst
Belgium

JAN VAN DERVEKENS

Manager
Mfg. Plant Systems
PAUL DIXON

Systems Consultant
GEOFFREY DOLL

Systems Analyst
RONALD SHAW

Programmer Analyst
WARREN CORMAN

Site Managers
WILLIAM FLORES - Linden
RICHARD LIMA - Calvert City
TOM WOJCIK - Texas City

Manager, Technical
Computing
STEVEN RIFKIN

Systems Analyst
JOE DZIEDZIC

Technical
Programmer Analyst
PETER HOPE

Programmer
TED WAGNER

Manager,
Adm. Systems
KATE SIEMSEN

Application Support
Specialist
KAREN KRAWCZUK

Systems Analyst
ROBERT PELLEGRINI

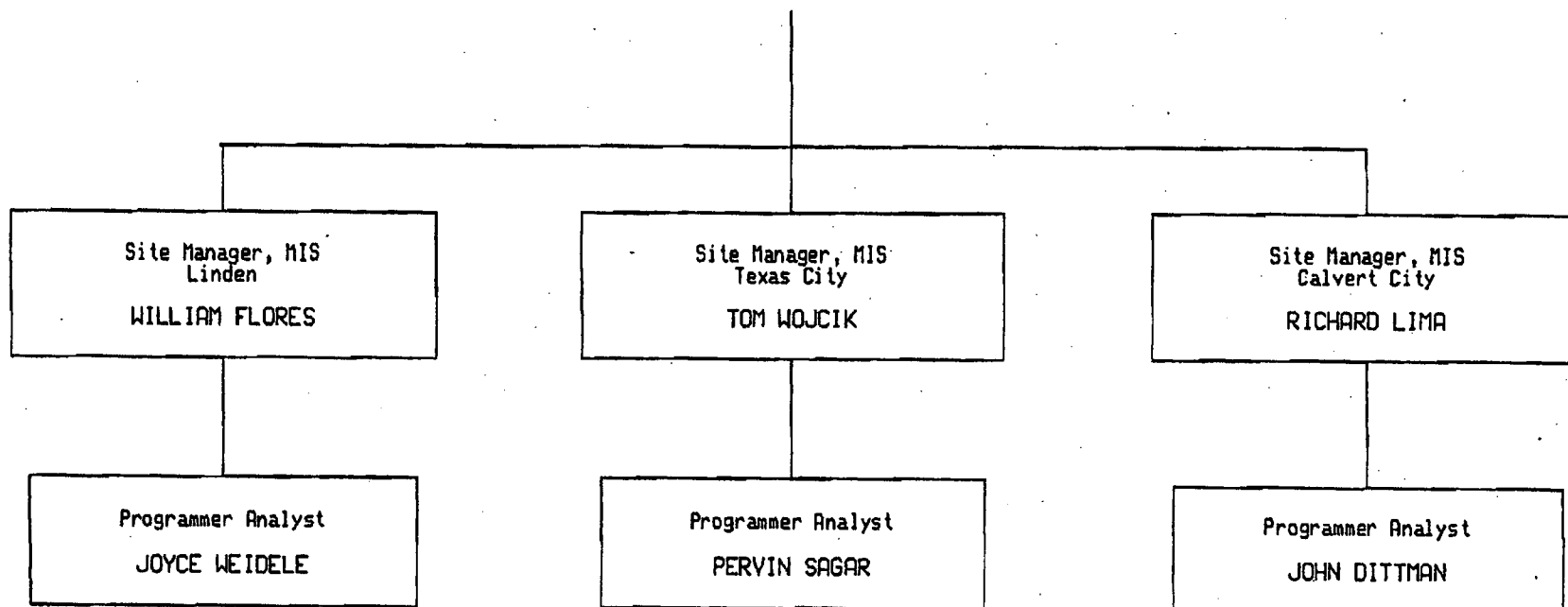
Systems Analyst
DOUG WALLENDJACK

Programmer Analyst
THOMASINA BREEN
CAROL GROBELS
Info. & Security Coordinator
SUE PAYNE-LaPALME

Data Administrator
JAY COREN

CHEM. 2-4A
FINANCE - M.I.S.
July 5, 1989

REPORTS TO
MANAGER - MGF. PLANT SYSTEMS
SEE CHEM. 2-4



CHEM. 3
MARKETING/SALES/ACETYLENES
August 7, 1989

REPORTS TO
SR. VICE PRESIDENT AND GENERAL MANAGER - ACETYLENES
SEE CHEM. 1

MANPOWER

Exempt	19
Nonexempt	6
Total	25

Vice President
Marketing & Sales
Acetylenes

RICHARD BAUMANN

Director Product
Management

FREDERICK KRUPIN

SEE CHEM. 3-2

Marketing Manager
Engineered Solvents

ANTHONY DURANTE

SEE CHEM. 3-2

Marketing Manager
Polymers

VINCE GURZO

SEE CHEM. 3-3

Communication
Manager

JOAN DIEHLING

Advertising
Assistant

BETTY FREY

National Sales
Manager

JIM POTTER

SEE CHEM. 3-1

Manager
Commercial Development
Surfactones

LEO THIELMANN

Manager, Commercial
Development, Water
Soluble Polymers

DAVE PRITCHARD

Mgr. Commercial
Dev./Drug Solubilization

PRADEEP PATEL

CHEM. 3-1
CHEMICAL SALES
October 1, 1989

REPORTS TO
VICE PRESIDENT
MARKETING 7 SALES - ACETYLENES
SEE CHEM. 3

MANPOWER (Field)

Exempt	26
Nonexempt	11
Hourly	2
Total	32

National Sales
Manager

JIM POTTER

Regional Sales Manager
West Coast

WILLIAM BRUNSON

Sales Engineer

STEVEN GELB
CARROLL DICKENS

Jr. Sales Engineer
RICHARD NIGHSWONGER

Regional Sales Manager
Midwest

DONALD STITSINGER

Sales Engineers

JOHN BRITTO
ALAN RODAK
PEGGY DORRANCE
THOMAS CHAMBERLINE

Regional Sales Manager
Northeast

PETER RUSSO

Sales Engineers

JAYSON DUSSA
BRUCE BENNETT
GENE GLANCY
NANCY WEBER-CURTH
PHILIP GOLDMAN
VINCENT SANSONE
DAVID MARCOS
DAVOOD FAGHANI

Regional Sales Manager
Southeast

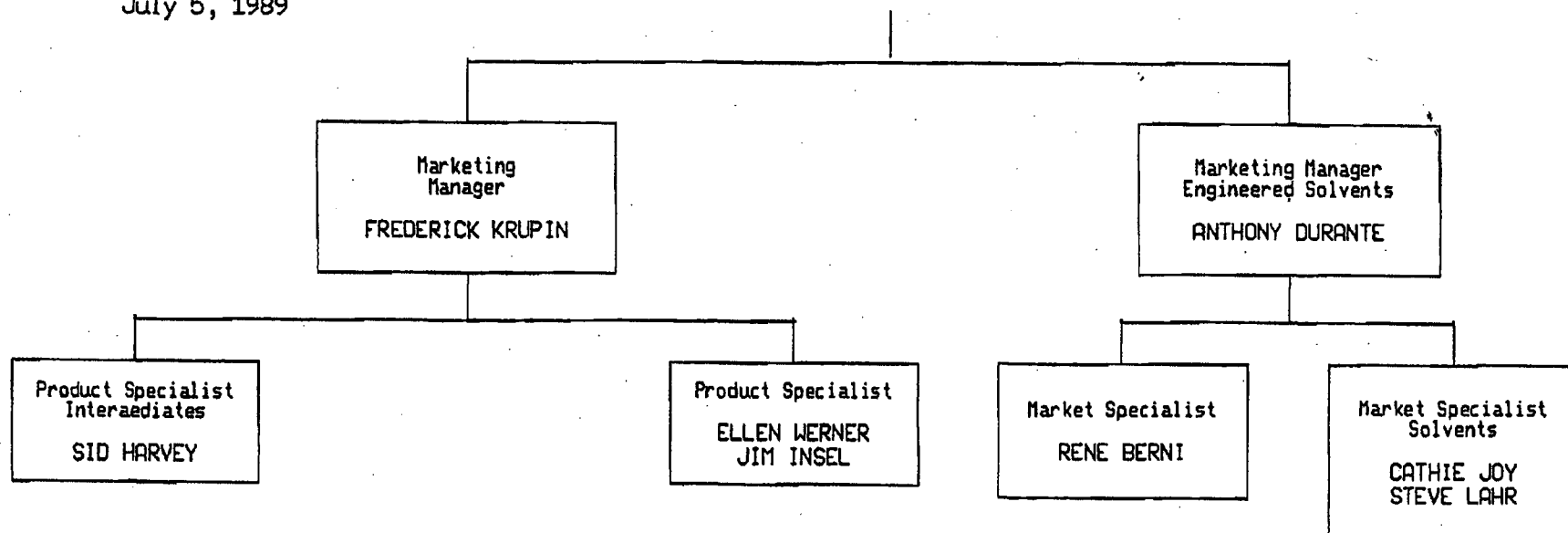
JOHN PALMER

Sales Engineers

PAUL HERSON
MARSHALL KAMRASS
DONALD PHILLIPS
JOSE ORTIZ
DONALD WEST
BOB LANGFORD
JEFF FOLKS

CHEM. 3-2
ACETYLENES
July 5, 1989

REPORT TO
VICE PRESIDENT - MARKETING & SALES, ACETYLENES
SEE CHEM. 3



CHEM. 3-3
ACETYLENS
July 5, 1989

REPORT TO
VICE PRESIDENT - MARKETING & SALES
ACETYLENS

Marketing Manager
Polymers

VINCE GURZO

Market Manager
Personal Care

RO OTERI

Market Manager
Coating & Adhesives

RON MARZOLI

Market Manager
Pharmaceuticals

NEIL ROSS

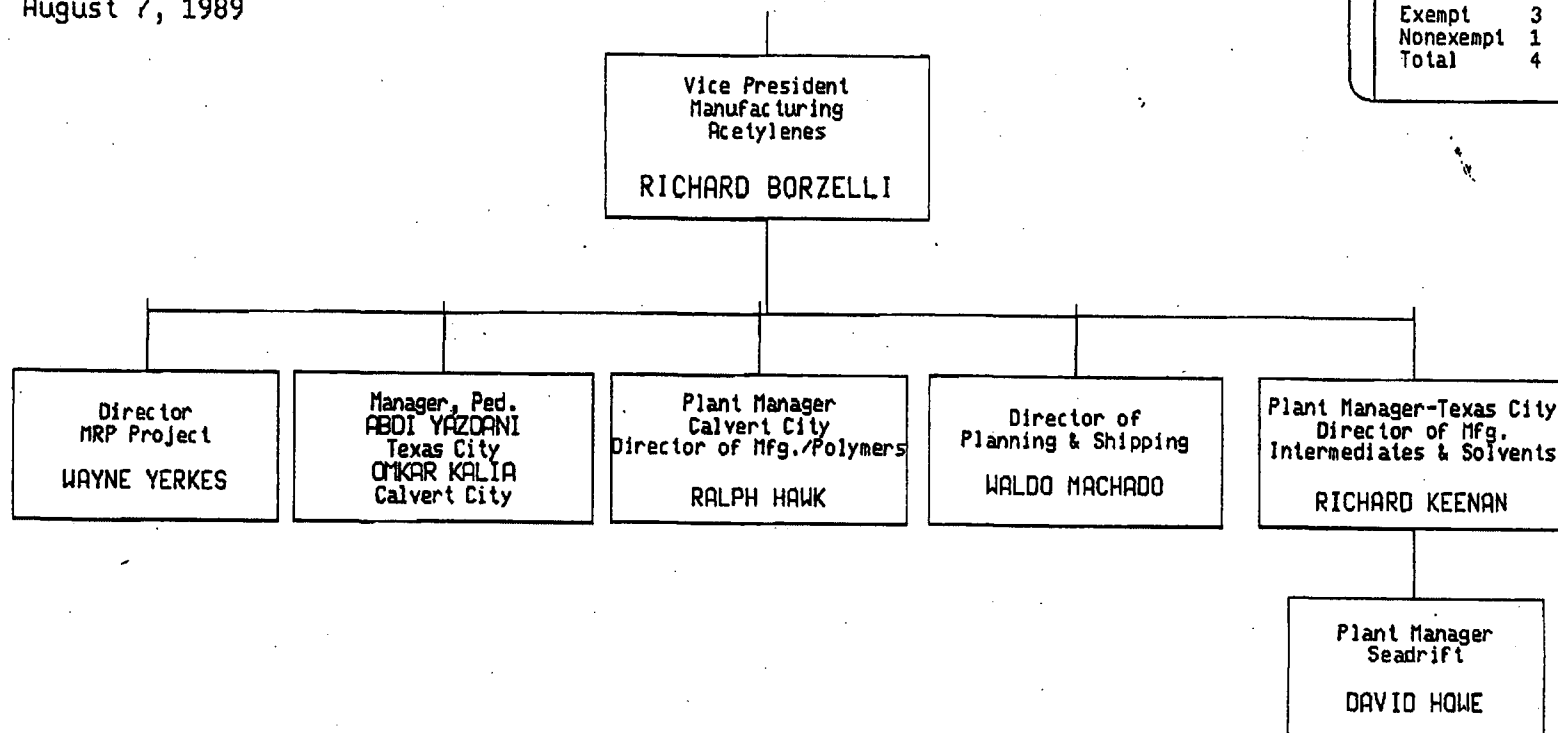
Market Specialist

JAN KOSIEK

CHEM. 4
MANUFACTURING
August 7, 1989

REPORTS TO
SR. VICE PRESIDENT & GENERAL MANAGER - ACETYLENES
SEE CHEM. 1

MANPOWER	
Exempt	3
Nonexempt	1
Total	4



CHEM. 5
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO
PRESIDENT - CHEMICALS
SEE CHEM. 1

MANPOWER

Exempt	72
Nonexempt	55
Total	127

Vice President
Research & Development

JOHN TANCREDI

Sr. Technical Associate
Radiation Graphics

DAVID LEWIS

SEE CHEM. 5-1

Corporate Fellow
WILLIAM BURLANT

SEE CHEM. 5-6

Director
Polymer Science

ROBERT LOGIN

SEE CHEM. 5-2

Director, Acetylene
Chemicals Research

PAUL TAYLOR

SEE CHEM. 5-3

Manager, Technical
Information Services

IRA NAZNITSKY

SEE CHEM. 5-4

Director
Analytical

EDWARD MALAWER

SEE CHEM. 5-1

CHEM. 5-1
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO
DIRECTOR, POLYMER/SCIENCE
SEE CHEM. 5

Group Leader
Pharmaceutical Specialities
R. HALDAR

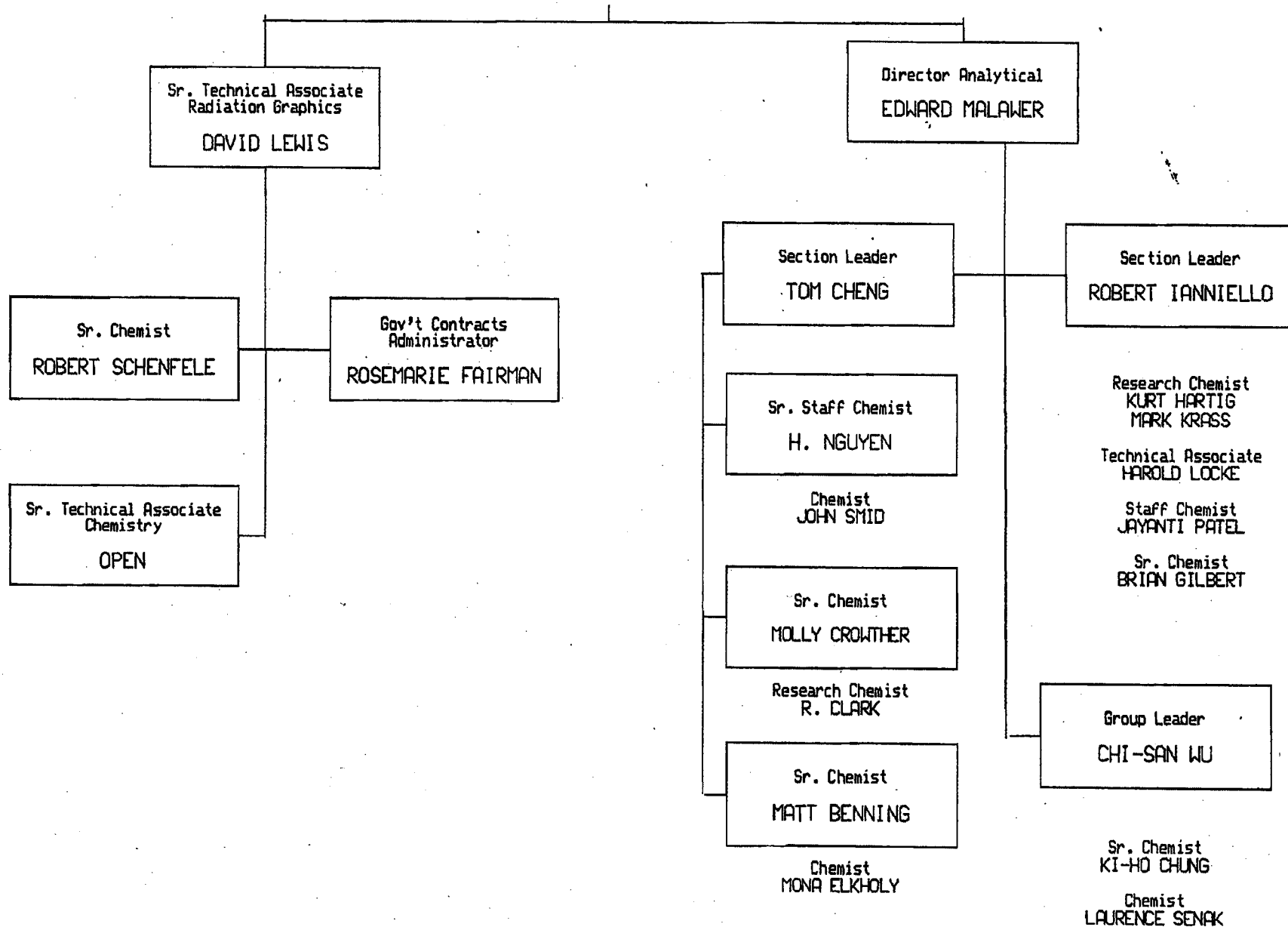
Staff Chemist/Excipients
B. GANGADHARAN

Sr. Research Chemist
Food Applications/
Denture Adhesives
W. PROSISE

Staff Chemist
Tablet Coatings
A. TIONGSON

CHEM. 5-1a
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO
VICE PRESIDENT - R & D
SEE CHEM. 5



CHEM. 5-2
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO
VICE PRESIDENT - R & D
SEE CHEM. 5

Director
Polymer/Science
ROBERT LOGIN

Group Leader
RATAN CHAUDHURI

SEE CHEM 5-2B

Group Leader
R. HALDAR

SEE CHEM 5-1

Group Leader
R. CHUANG

SEE CHEM 5-4

Section Manager
JOSEPH NIU

SEE CHEM 5-3

Section Manager
MO TAZI

SEE CHEM 5-2A

Sr. Tech. Assoc
J. MERIANOS

SEE CHEM 5-4A

CHEM. 5-2A
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO
DIRECTOR, POLYMER/SCIENCE
SEE CHEM. 5-2

Section Manager
MO TAZI

Sr. Technical Assoc.
MIKE HELIOFF

Staff Chemist
E. WALLS

Technical Assoc.
STEVEN KOPOLOW

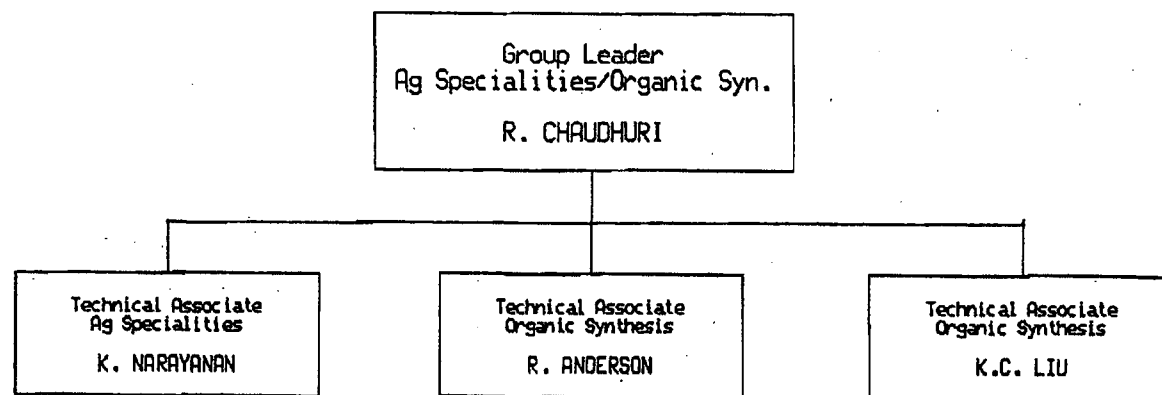
Chemist
C. BIRES

Sr. Research Chemist
Y. KWAK

Sr. Staff Chemist
T. CLIFTON

CHEM 5-2B
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO DIRECTOR
POLYMER/SCIENCE
SEE CHEM. 5-2



CHEM. 5-3
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO
DIRECTOR, POLYMER/SCIENCE
SEE CHEM. 5-2

Section Manager,
Adhesives

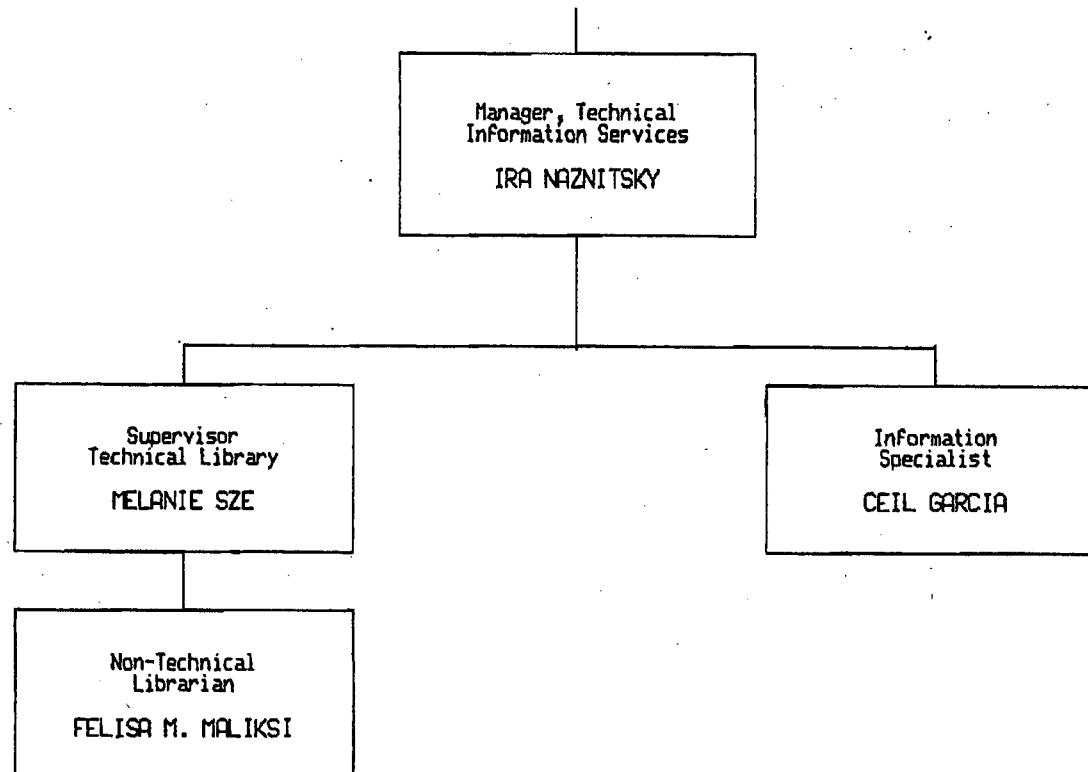
JOSEPH NIU

Research Chemist

J. PELESKO

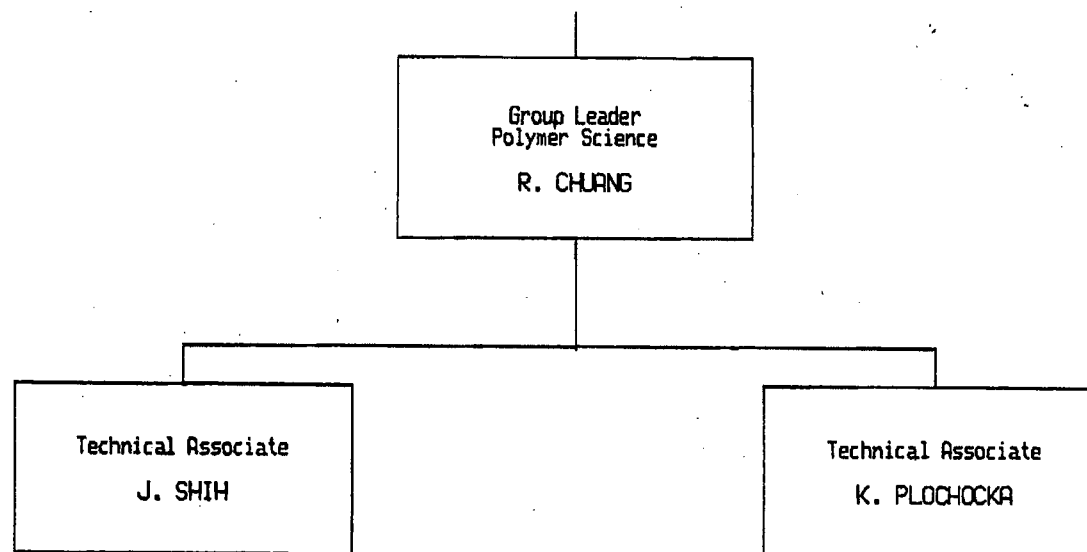
CHEM 5-3a
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO
VICE PRESIDENT - R & D
SEE CHEM 5



CHEM 5-4
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO
DIRECTOR, POLYMER SCIENCE
SEE CHEM 5-2



CHEM 5-4A
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO
DIRECTOR, POLYMER/SCIENCE
SEE CHEM 5-2

```
graph TD; A["Sr. Technical Associate  
Special Projects  
J. MERIANDS"] --- B["Staff Chemist  
P. GARELICK"]
```

Sr. Technical Associate
Special Projects
J. MERIANDS

Staff Chemist
P. GARELICK

CHEM. 5-5
RESEARCH & DEVELOPMENT
October 1, 1989

REPORTS TO
VICE PRESIDENT - R&D
SEE CHEM. 5

Director, Chemicals
& Process Research
PAUL TAYLOR

Sec. Mgr.
Process Chem.
TERRY SMITH

Sec. Mgr. Process
Tech. & Engineered
Solvents
WALDO DETHOMAS

Sec. Mgr.
Process Eng.
JEFF COHEN

Safety Admin.
DENNIS JOHNSON

Sr. Staff Chem.
G. DANDREAUX

Sr. Staff Chemist
Y. REUVEN

Group Leader
J. ZAMORA

Tech. Assoc.
W. MANDELLA

Staff Chemist
F. FUSIAK

Process Eng.
L. COYLE

Group Leader
W. BUCHANAN

Sr. Proc. Eng.
M. AVERSA

Chemist
M. NEGRIN

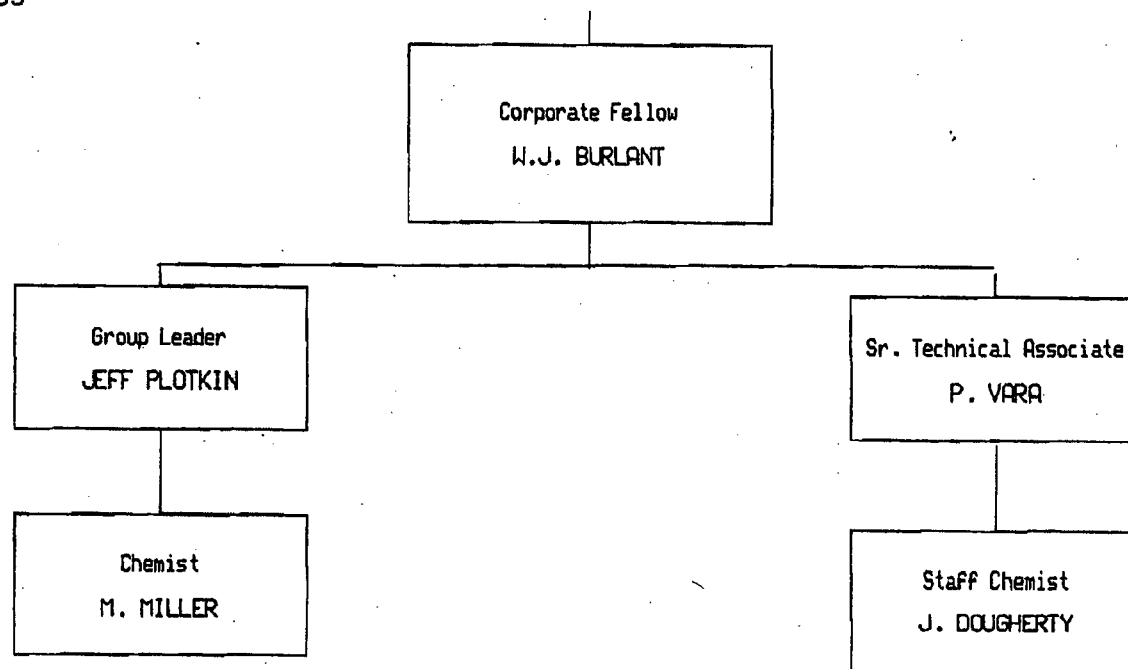
Process Eng.
M. ECONOMIDIS

Sr. Proc. Eng.
R. BISS

Sr. Proc. Eng.
M. DAVILA

CHEM. 5-6
VINYL ETHER COATINGS
October 1, 1989

REPORTS TO
VICE PRESIDENT - R&D
SEE CHEM 5



CHEM. 6
MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
August 7, 1989

REPORTS TO
PRESIDENT - CHEMICALS
SEE CHEM. 1

MANPOWER

Exempt	101
Nonexempt	25
Hourly	7
Total	133

Vice President
Material Management
and Technical Services
ABRAHAM LINDENAUER

Director
Engineering
CHARLES BARBAZ

SEE CHEM 6-1

Director
Quality Assurance
ARTHUR FALK

SEE CHEM. 6-2

Managing Director
Environmental, Product
& Employee Safety
WILLIAM CHAMBERS

SEE CHEM. 6-5

Director, Purchasing
Construction, Plant MRO
and Packaging
JOHN O'KEEFE

SEE CHEM. 6-3

Director
Distribution & Transportation
JOHN McNICHOL

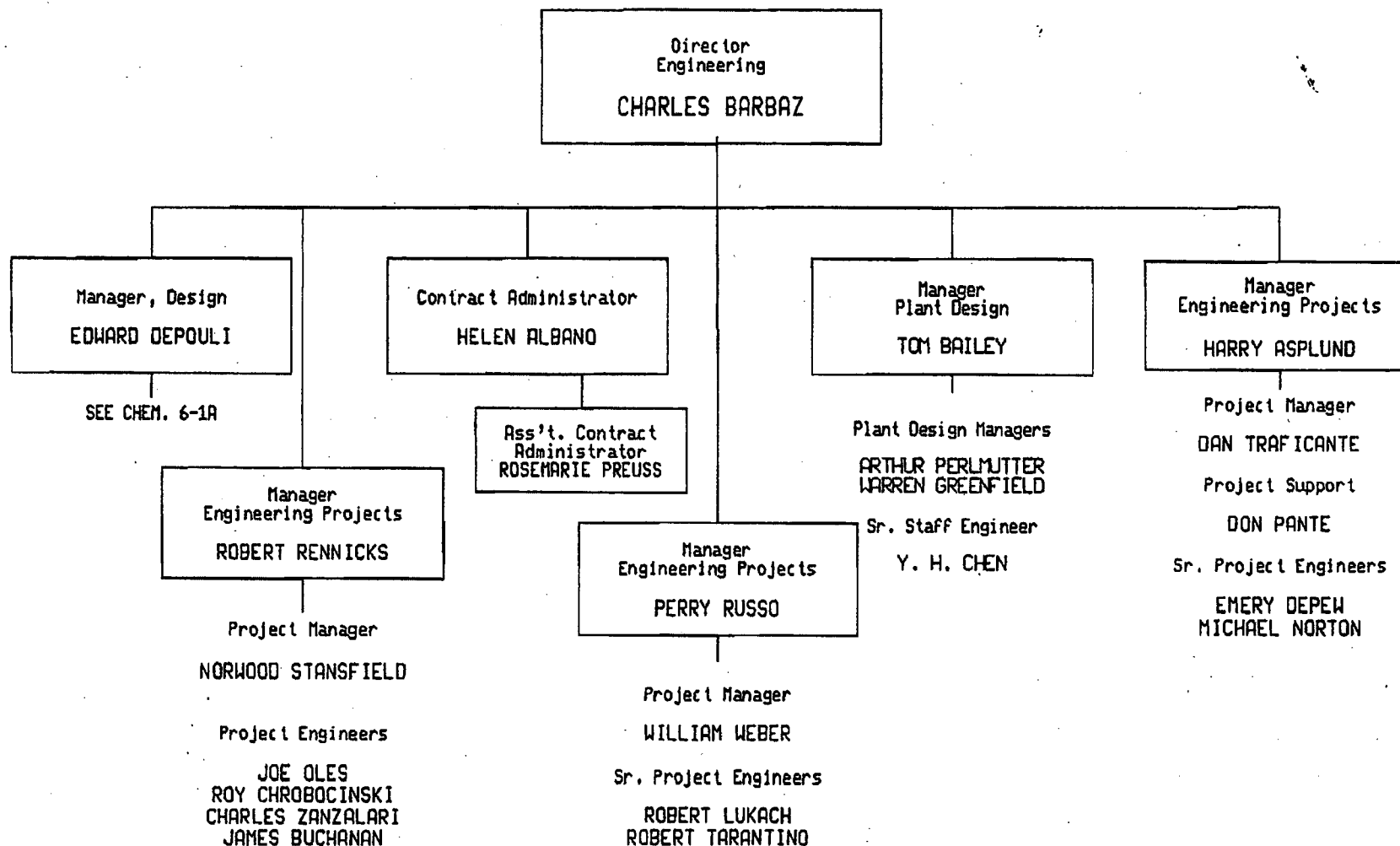
SEE CHEM 6-4

Director, Purchasing
Raw Materials, Energies
MURRAY KARTEN

SEE CHEM. 6-3

CHEM. 6-1
MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
August 7, 1989

REPORTS TO
VICE PRESIDENT - MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
SEE CHEM. 6



CHEM. 6-1A
MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
August 7, 1989

REPORTS TO
ENGINEERING DIRECTOR
SEE CHEM 6-1

Manager, Design
EDWARD DEPOULI

Process Control
ROBERT CASCIANO

Cost Estimator
ED CAMAYA
ROBERT JEMISON

Sr. Field Engineers
SCOTT DUNCHES
DAVE KRAMER

Sr. Designer Mechanical
TOM SALIMBENE

Sr. Proj. Design Eng.
JOHN KOBRYN
JAMES VAN BLARCOM

Electrical
ROBERT SMITH

Structural
Staff Engineer
AMADO LOPEX

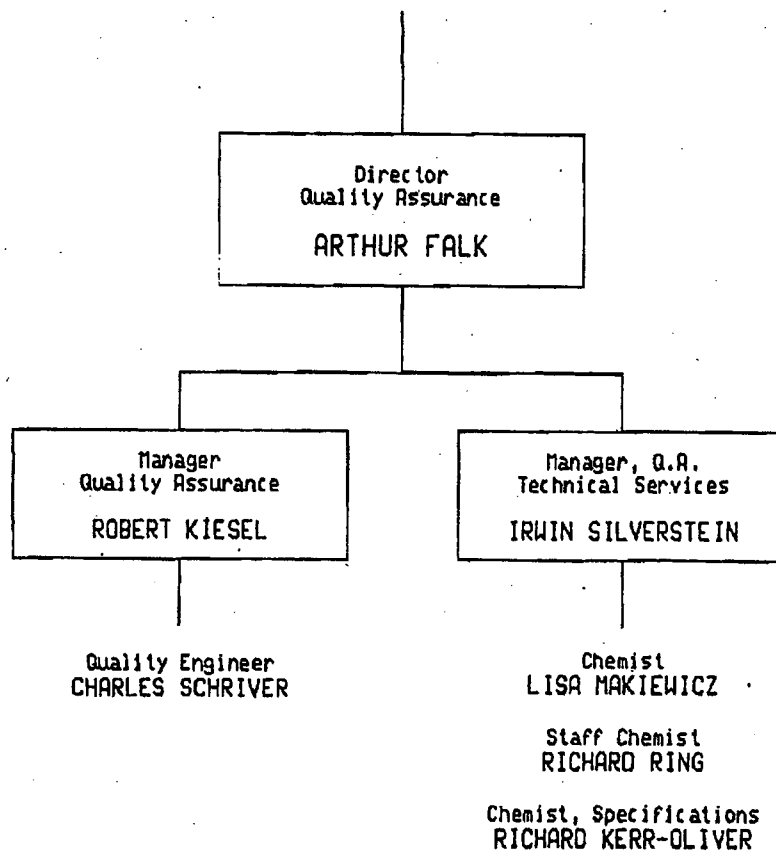
CAD Operators
FELIX BAEZ
ROBERT WILLEY

Project Design
Engineer
SAL GIURINTANO

Instrumentation
KEITH SALVIANO
BRIAN VAN DEURSEN

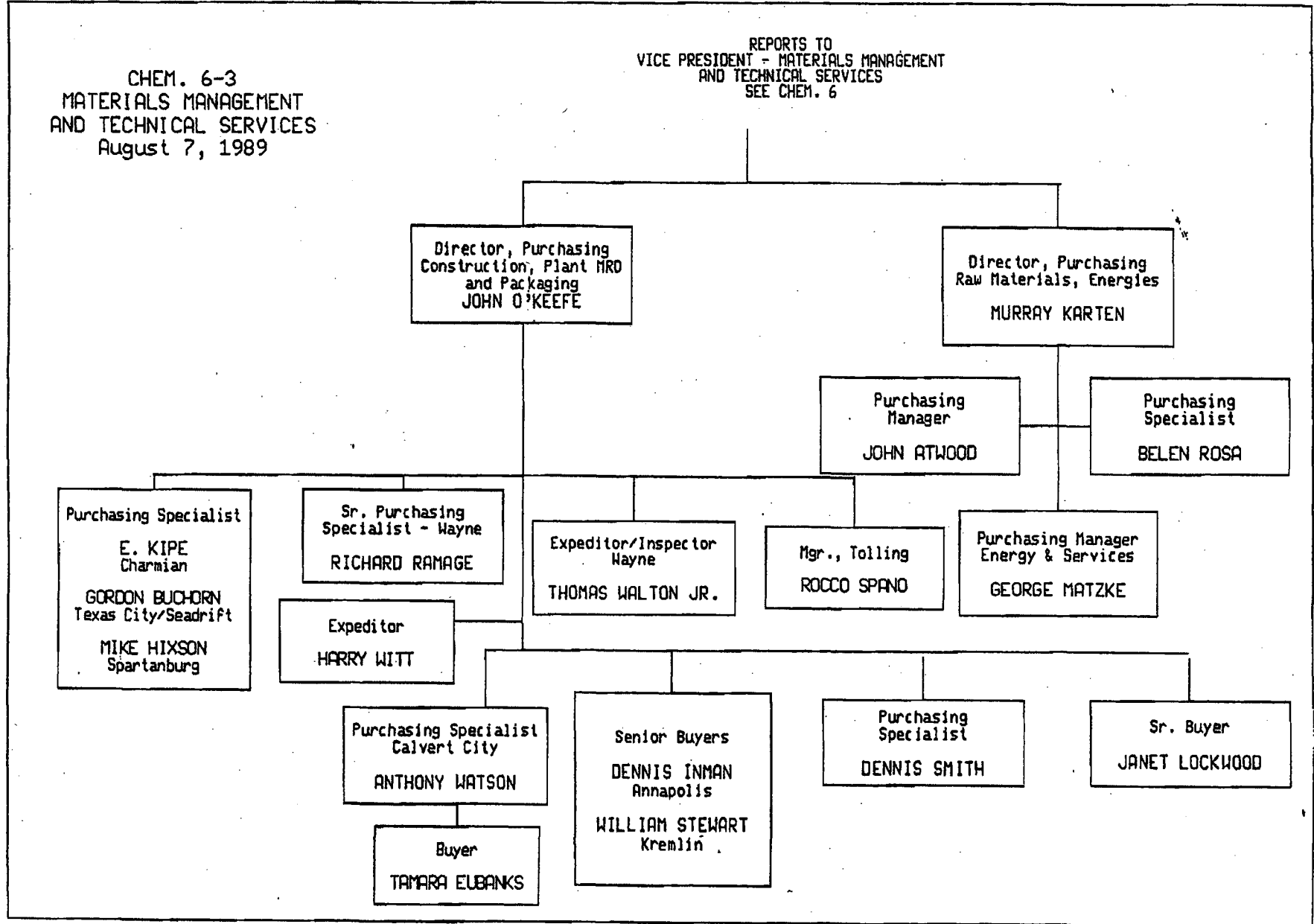
CHEM. 6-2
MATERIALS MANAGEMENT AND
TECHNICAL SERVICES
April 3, 1989

REPORT TO
VICE PRESIDENT - MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
SEE CHEM. 6



CHEM. 6-3
MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
August 7, 1989

REPORTS TO
VICE PRESIDENT - MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
SEE CHEM. 6



CHEM. 6-4
MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
October 1, 1989

REPORTS TO
VICE PRESIDENT - MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
SEE CHEM. 6

Director
Distribution & Transportation
JOHN McNICHOL

Distribution Mgr.
Customer Service
GEORGE WEINER

Manager
Customer Service
Linden
A.F. BURNS

Project Manager
Customer Service
M. LEOTTI

Manager
Transportation
ROBERT ZECK

SEE CHEM. 6-4A

Supervisor
Order Entry
GEORGE NOVALANY

Supervisor
Order Entry
ROBERT RIGBY

Supervisor
Order Processing
MICHAEL FEENEY

Sr. Transportation
Analyst
JAMES MACKAY

Sr. Transportation
Analyst
EDWIN HEAD

Order Service
Specialist
VIRGINIA TEWES
PATRICIA MAROWSKY
LYNN BERTHELSSEN
A. ZALESKYEWSKI
A. GORDON

Order Service
Specialist
D. NOLAN
K. WEBSTER
A. NOTCHEY
S. MITERKO

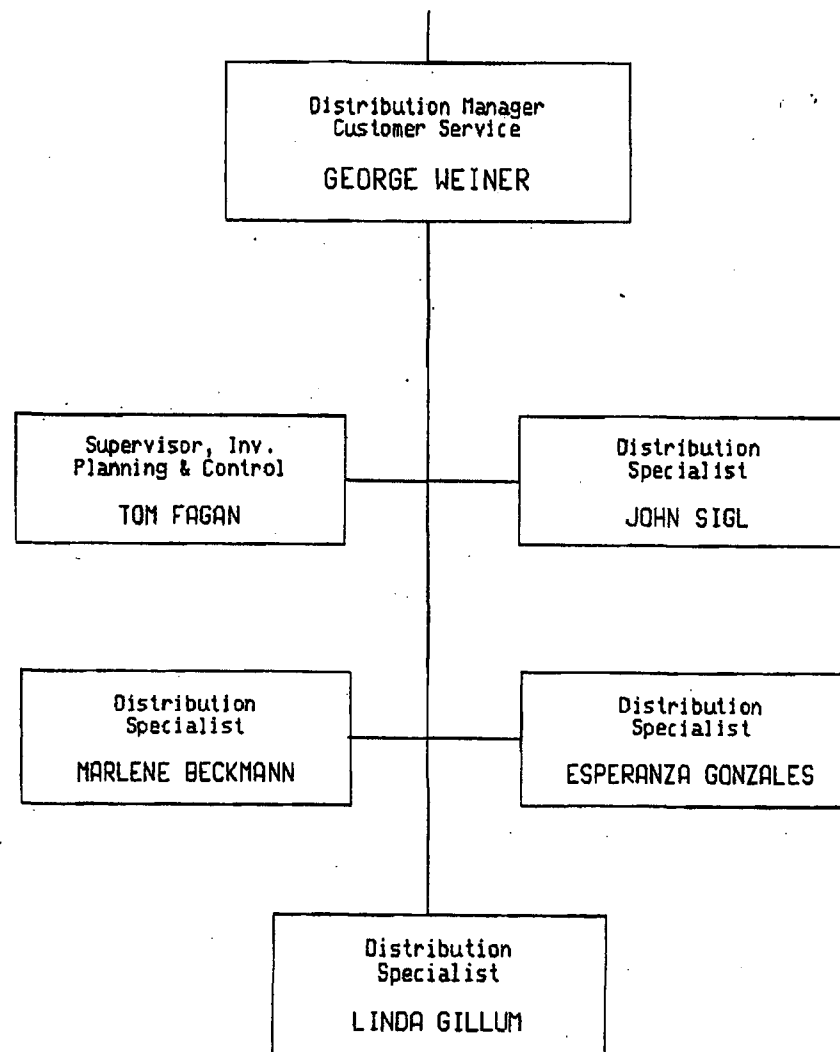
Sr. Transportation
Analyst
JAMES CROWDELL

Sr. Transportation
Analyst
JAMES FURST

Transportation
Analyst
DEBBIE KNEIS

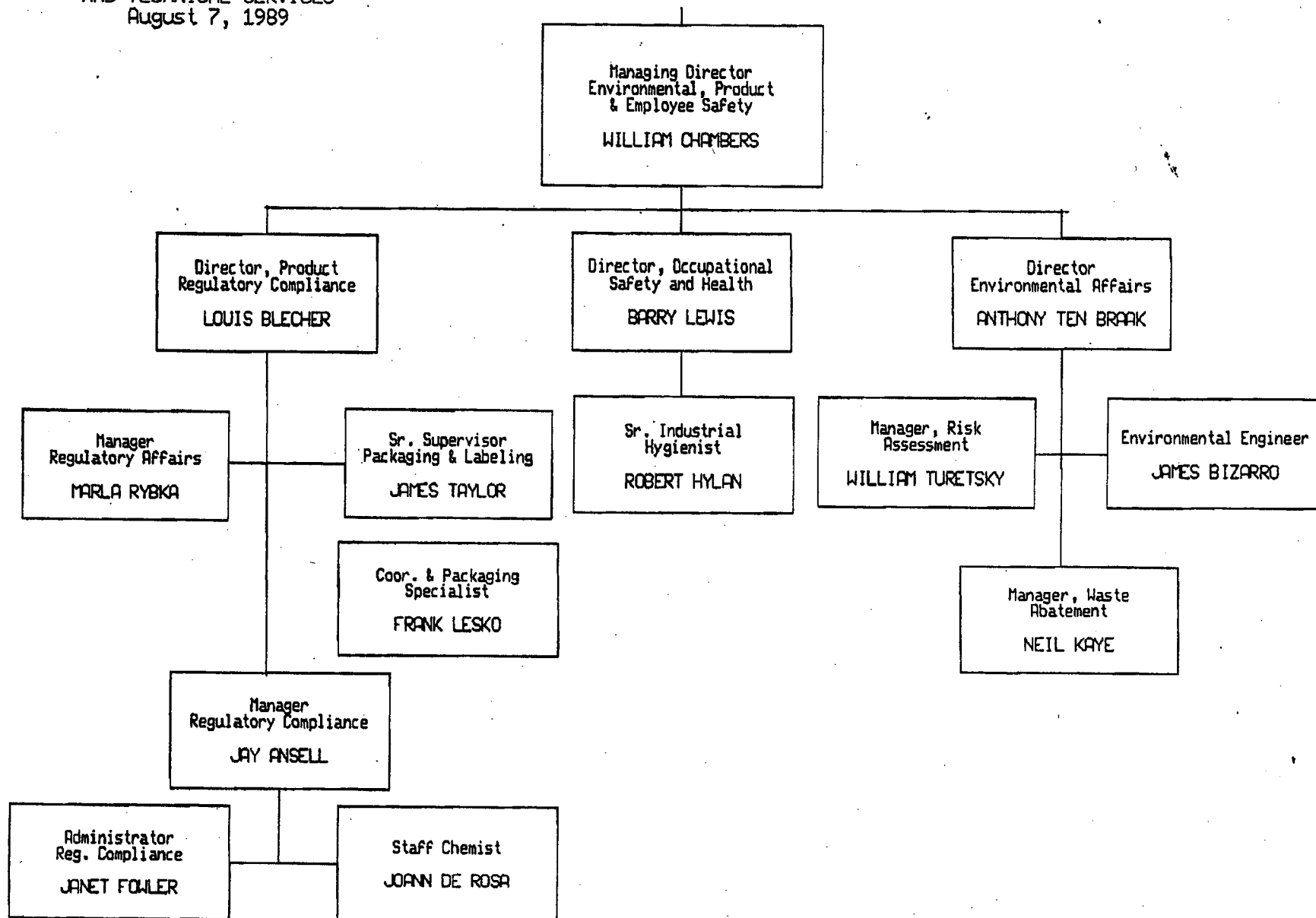
CHEM. 6-4A
MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
October 1, 1989

REPORTS TO
DIRECTOR, DISTRIBUTION & TRANSPORTATION
SEE CHEM. 6-4



CHEM. 6-5
MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
August 7, 1989

REPORTS TO
VICE PRESIDENT - MATERIALS MANAGEMENT
AND TECHNICAL SERVICES
SEE CHEM. 6



CHEM. 7
SURFACTANT CHEMICALS
BUSINESS UNIT
August 7, 1989

REPORTS TO
PRESIDENT - CHEMICALS
SEE CHEM. 1

MANPOWER

Exempt	15
Nonexempt	11
Total	26

Sr. Vice President
General Manager
Surfactants

FRANK E. SHEEDER, JR.

Vice President
Marketing & Sales
WILLIAM KRISTOFF

SEE CHEM. 7-1

President
Alkaril Ltd.
BERNARD WEST

SEE CHEM. 7-4

Director
Manufacturing
AL CARLIN

SEE CHEM. 17

Director of
Southern Operations
THOMAS BEAL

SEE CHEM. 7-3

Director, New Business
& Application
Development
CHARLES TALLEY

SEE CHEM. 7-2

Manager
Human Resources
GERALD TOPPING

Personnel Assistant
JANET TARCZYNSKI

CHEM. 7-1
SURFACTANT CHEMICALS
BUSINESS UNIT
October 1, 1989

REPORTS TO
SR. V.P. & GENERAL MANAGER - SURFACTANTS
SEE CHEM. 7

MANPOWER

Exempt	16
Nonexempt	9
Total	25

Vice President
Marketing & Sales
WILLIAM KRISTOFF

Manager
Production Planning
DAN SULLIVAN

Manager
National Sales
JAMES MANIER

Marketing Manager
Surfactants
GREG HINER

Regional Sales
Manager - Northeast
ALAN CLARK

Regional Sales
Manager - West
Acetylenes & Surfactants
BILL BRUNSON

Sr. Product Engineer
SCOTT MARSI

Product Engineer
JOE SMOKOWSKI

Marketing Specialist
GERALDINE MERTEN

Sales Engineers
BOB OLSEN
MARK SZCZAWINSKI
GEORGE FRADE

Sales Engineers
KEN LESNIEWSKI

Regional Sales
Manager, Midwest
EMERSON BYRD

Regional Sales
Manager - Southeast
ROBERT SUTHERLAND

Manager, Distribution &
Formulator Programs
BILL FERGUSON

Manager, Tech Support
ED JAKUSH

Sales Engineers
PAUL BEDARD
BOB DUNTON
MARK FULTON
TOM MATUS

Sales Engineers
JANE SCHELL
ART SINGLETON
DAVID KINNEY

CHEM. 7-2
SURFACTANT CHEMICALS
BUSINESS UNIT
October 1, 1989

REPORTS TO
SR. VICE PRESIDENT & GENERAL MANAGER - SURFACTANTS
SEE CHEM. 7

Director New Business
& Application
Development

CHARLES TALLEY

Group Leader
Emulsion Technology
MANNY DAHANAYAKE

Staff Chemist
Oil Field & Minerals
DAVID DINO

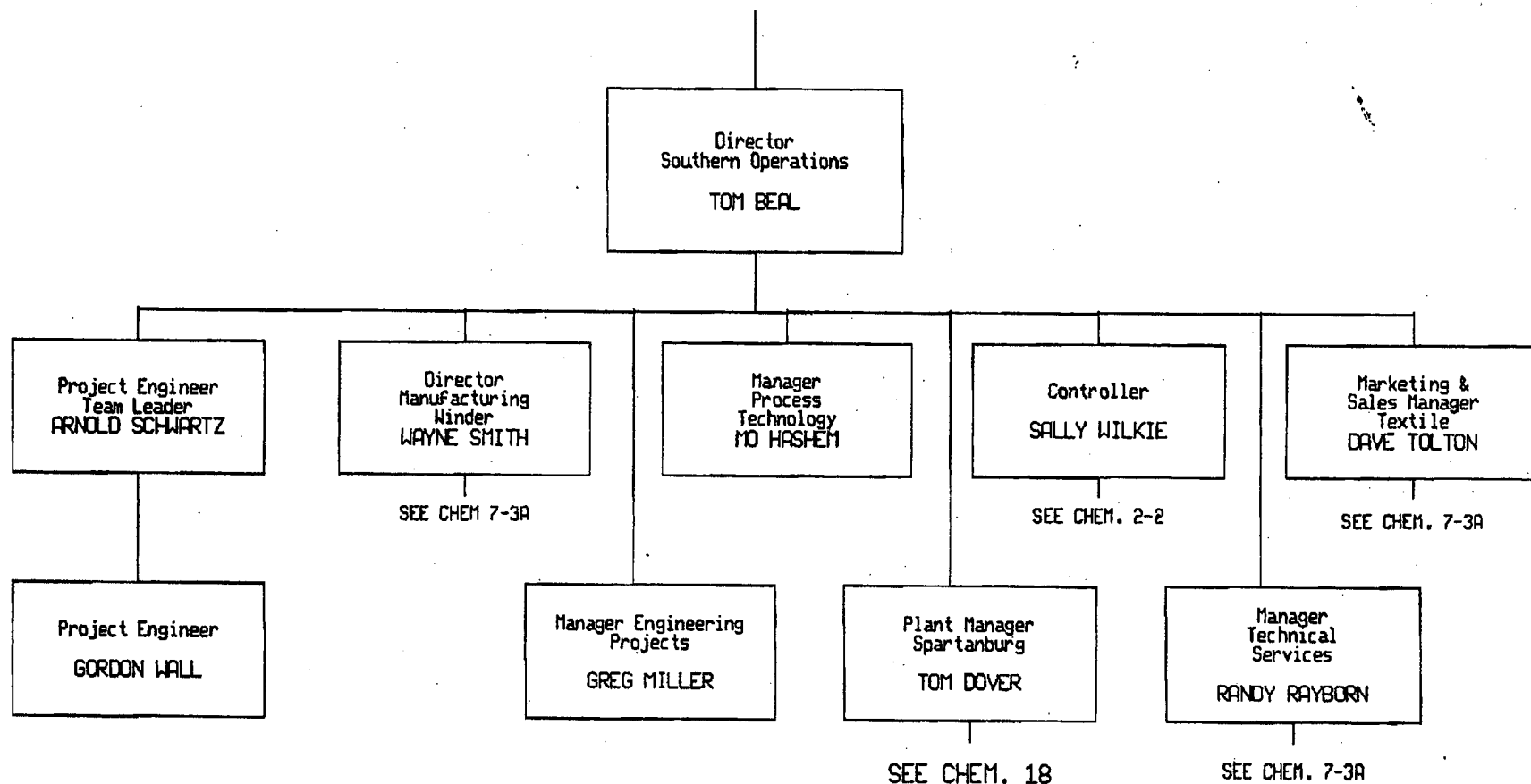
Section Manager
Emulsion Polymerization
FRED ROBINSON

Business Development
Specialists
CARMINE SESA
JIM FOLEY
LOIS HOROWITZ

Technical Associate
Personal Care/Pharm.
THOMAS SCHAMPER

CHEM. 7-3
SURFACTANT CHEMICALS
BUSINESS UNIT
October 1, 1989

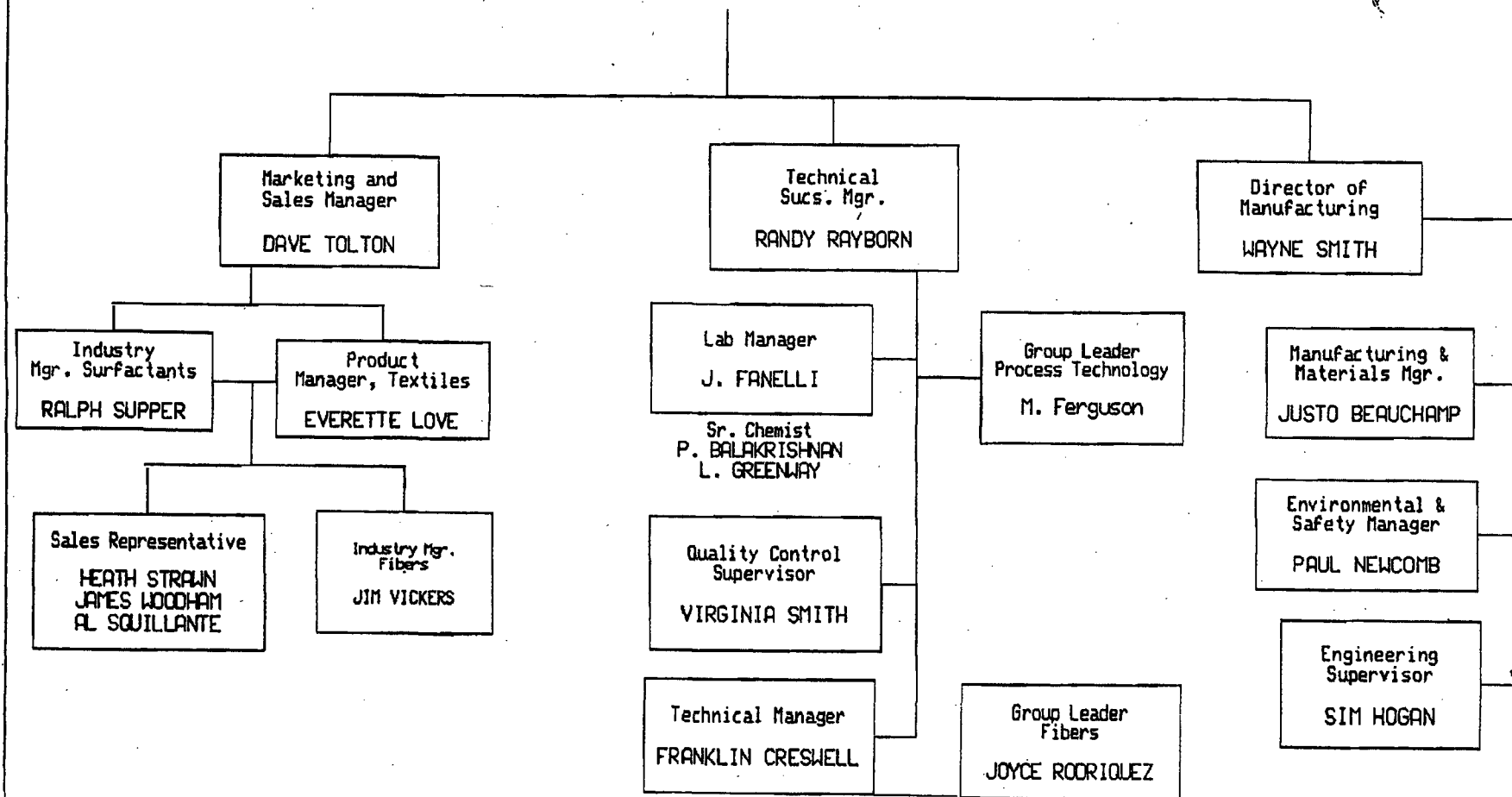
REPORTS TO
SR. VICE PRESIDENT & GENERAL MANAGER - SURFACTANTS
SEE CHEM. 7



Surfactant
Task Force
SID BESMERTNIK
CHARLES HOLDERRIED
RAY ORZECOWSKI

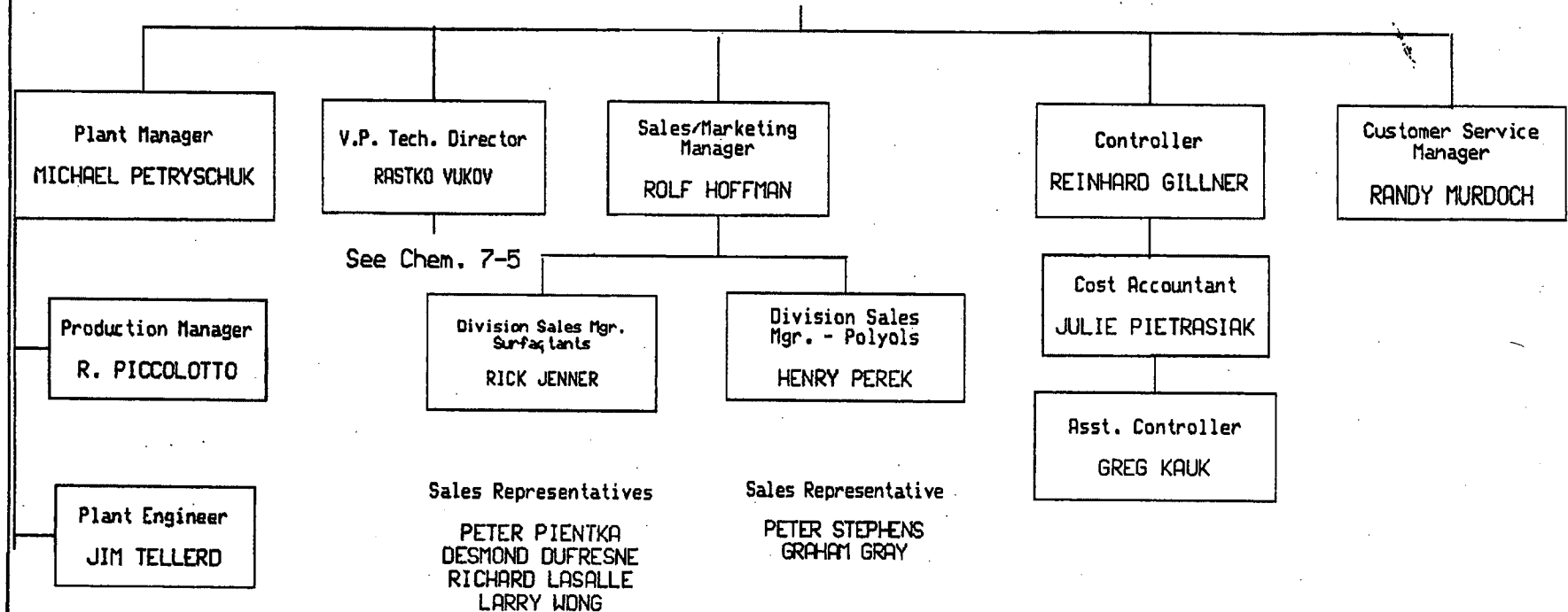
CHEM. 7-3A
SURFACTANTS CHEMICALS
BUSINESS UNIT
October 1, 1989

REPORT TO
DIRECTOR, SOUTHERN OPERATIONS
SEE CHEM. 7-3



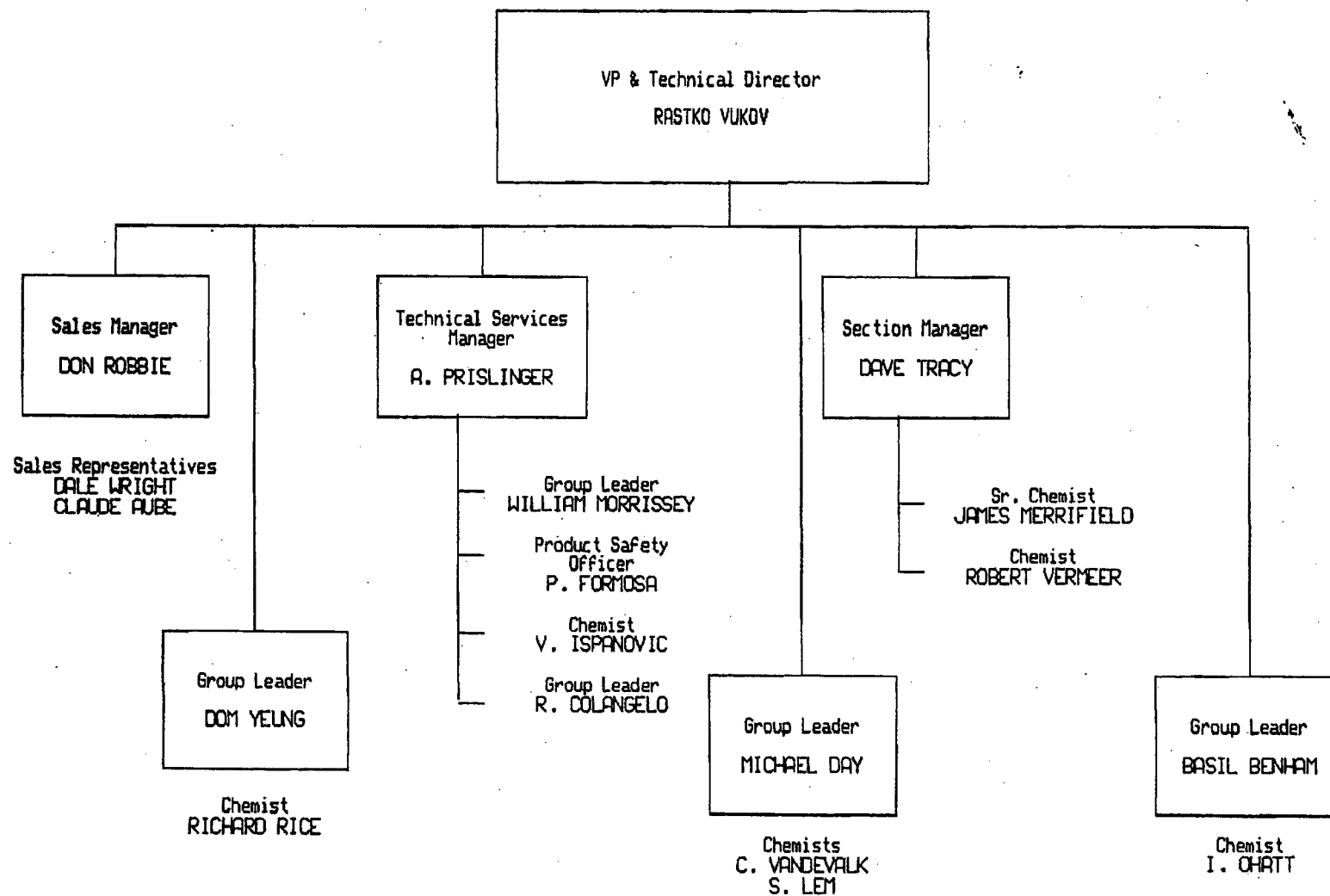
CHEM. 7-4
SURFACTANT CHEMICALS
BUSINESS UNIT
October 1, 1989

REPORTS TO
PRESIDENT, ALKARIL LTD.
SEE CHEM. 7



CHEM. 7-5
SURFACTANT CHEMICALS
BUSINESS UNIT
October 1, 1989

REPORTS TO
PRESIDENT, ALKARIL LTD.
SEE CHEM. 7



CHEM. 8
MINERAL PRODUCTS
BUSINESS UNIT
October 1, 1989

REPORTS TO
PRESIDENT - CHEMICALS
SEE CHEM. 1

MANPOWER

Exempt	8
Nonexempt	6
Total	14

Vice President
General Manager
Mineral Products

T.H. KING

Director Marketing
MIKE SHELBERT

Mgr. Customer Service
ROBERT TOTH

Customer Service
Administrator
NINA SOBOLEWSKI

Director
Manufacturing
MIKE YOUNG

SEE CHEM. 8-1

Manager, Process
Engineering

INGO JOEDICKE

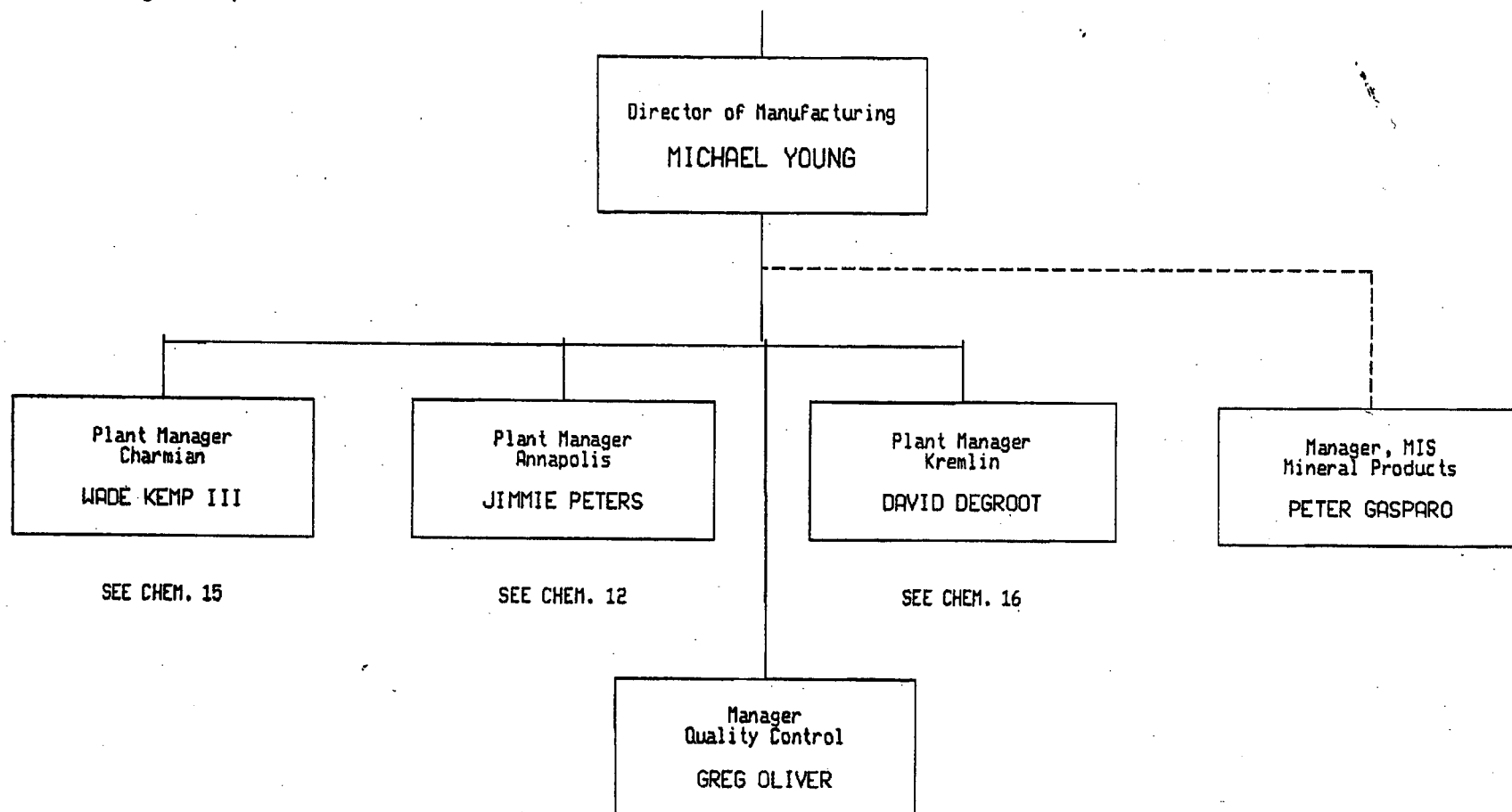
SEE CHEM. 8-2

National Sales Manager
DAVID LITTLE

Sr. Sales Engineer
JAMES PICKOWITZ

CHEM. 8-1
MANUFACTURING - MINERAL PRODUCTS
August 7, 1989

REPORTS TO
V.P. & GENERAL MANAGER - MINERAL PRODUCTS
SEE CHEM. 8

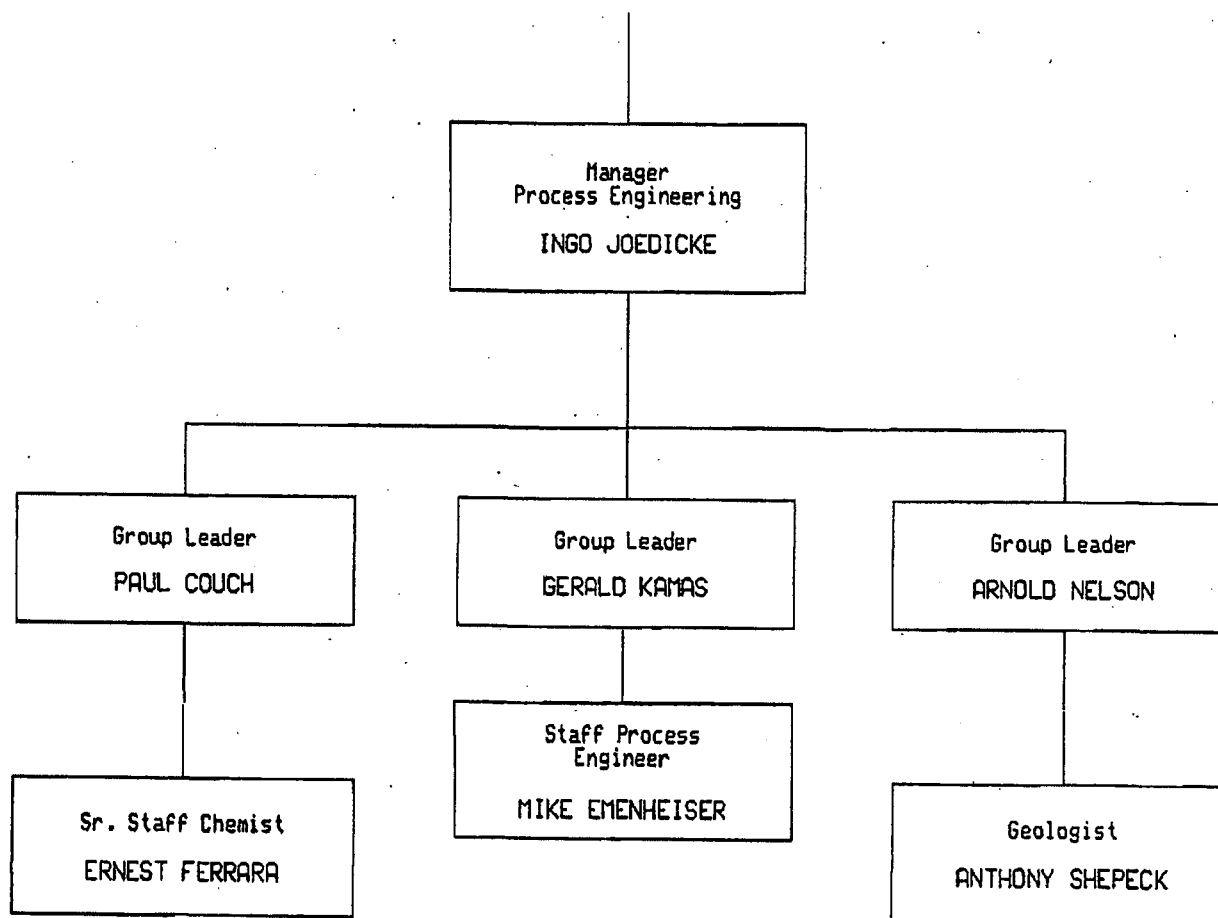


CHEM. 8-2
MINERAL PRODUCTS
August 7, 1989

REPORTS TO
V.P. & GENERAL MANAGER-MINERAL PRODUCTS
SEE CHEM. 8

MANPOWER

Exempt	7
Nonexempt	7
Total	14



CHEM. 9
ADVANCED MATERIALS
August 7, 1989

REPORTS TO
PRESIDENT - CHEMICALS
SEE CHEM. 1

MANPOWER

Exempt	11
Nonexempt	2
Total	13

Vice President &
General Manager
Advanced Materials

ART DRESNER

Business Manager,
Electronic Imaging
Products

VAN RHONHEIMER

Production Manager

ANTHONY PILATO

Product
Specialist

DENNIS LEE

Sales
Coordinator

CAROL BURPEAU

Senior Scientist

MICHAEL DONAHUE

SEE CHEM. 9-1

Manager, Planning

SOTIRI PAPOULIAS

Group Leader
PED & Q C

ROBIN MELENDEZ

Plant Manager
Huntsville

PAUL HUBLER

CHEM. 10
HUMAN RESOURCES
October 1, 1989

REPORTS TO
PRESIDENT - CHEMICALS
SEE CHEM. 1

MANPOWER	
Exempt	3
Nonexempt	4
Total	7

Vice President
Human Resources
GERALD WHITMORE

Manager
Human Resources - Surfactants
GERALD TOPPING

Manager
Compensation/Benefits
ANNA MAE LITZENBERGER

Director
Human Resources - International
NEIL RALLEY

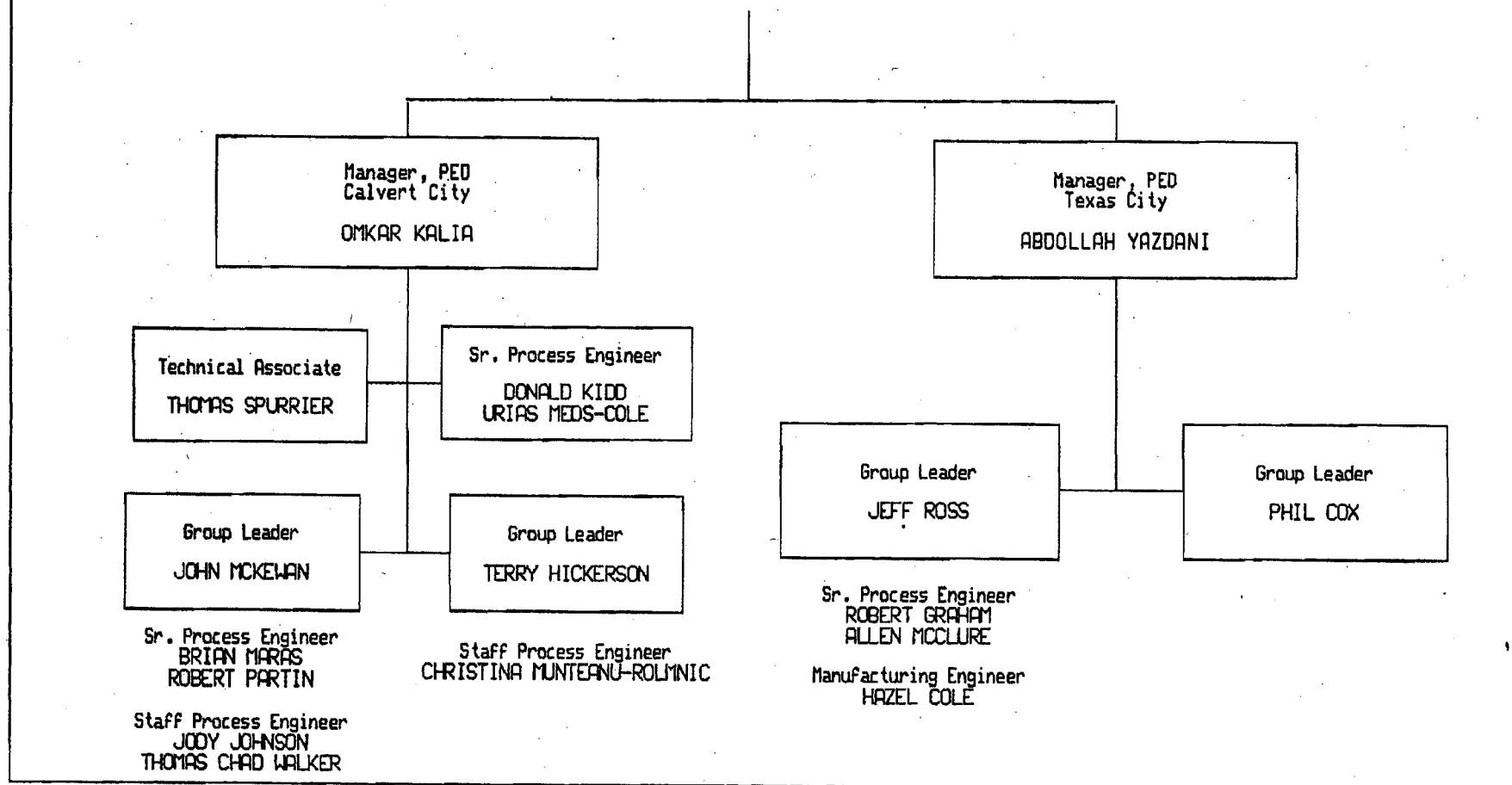
Plant H.R. Manager
CONNIE MUSCARELLA/LINDEN

Manager, Organizational
Development
JOSEPH MARTUCCI

Plant H.R. Managers
MARGIE MONCRIEF/TEXAS CITY
GUY KEALLY/CALVERT CITY

CHEM. 11
PED - ACETYLENES
October 1, 1989

REPORTS TO
VICE PRESIDENT MANUFACTURING, ACETYLENES
SEE CHEM. 1-1



CHEM. 12
ANNAPOLIS PLANT
July 5, 1989

REPORTS TO
DIRECTOR OF MANUFACTURING - GRANULES
SEE CHEM. 8-1

MANPOWER

Exempt	27
Nonexempt	12
Hourly	105
Total	144

Plant Manager
Annapolis

JIMMIE PETERS

Superintendent
Granule Department
ED HEDGECORTH

Quality Assurance
Supervisor
ERIC SIMMONS

Quarry Foreman
VIRGIL KELLEY

Mill Foreman
DONALD FIREBAUGH
RONALD CLARK
DONALD GOODMAN
LONNIE BROOKS

Maintenance
Superintendent
RUSSELL COLLINS

Maintenance
Planner/Scheduler
JIM DAVIS

Maintenance Foreman
OLEN MIDKIFF
CHARLES FITZGERALD
CLEVE HINKLE
JAMES SCAGGS

Sr. Plant Engineer
DENNIS MCGEE

Project Engineer
JOHN ELSER

Superintendent
Coloring Department
JOE DEAN

Coloring Foreman
FLOYD FORD
WADE KEMP JR.

Production Control
Supervisor
ERIC FALER
CLAY MARSH

Loading Foreman
JAMES FUNK
MIKE HULL

CHEM. 12-1
ANNAPOLIS PLANT
January 1, 1989

REPORTS TO
PURCHASING MANAGER
EQUIPMENT & CONTRACTS
SEE CHEM. 6-3

Senior Buyer
DENNIS INMAN

REPORTS TO
CONTROLLER, MINERAL PRODUCTS
SEE CHEM. 2

Plant Controller
MARVIN JOHNSON

CHEM. 14
CALVERT CITY PLANT
October 1, 1989

REPORTS TO
VICE PRESIDENT - MANUFACTURING
SEE CHEM. 4

MANPOWER

Exempt	92
Nonexempt	39
Hourly	340
Total	471

Plant Manager - Calvert City
Director of Mrg. - Polymers

RALPH HAWK

Manager
Quality Assurance
IRA GOLDKNOPF

SEE CHEM. 14-1

MPR Site Leader
LARRY LACROIX

Production Manager
DAVE WOMMACK

SEE CHEM. 14-3

Manager,
Planning & Shipping
WILLIAM CRABTREE

SEE CHEM. 14-5

Manager, Safety
& Environmental
EARL BLAIR

SEE CHEM 14-6

Plant Quality
Engineer
JOE LAVERDI

Manager, Maintenance
and Engineering
DOUG FOSTER

SEE CHEM. 14-2

Manager
Human Resources
GUY KEALLY

SEE CHEM. 14-5

Manager
M.I.S.
RICH LIMA

SEE CHEM. 2-3A

Purchasing
Specialist
ANTHONY WATSON

SEE CHEM. 14-5

Plant Controller
DONALD MYERS

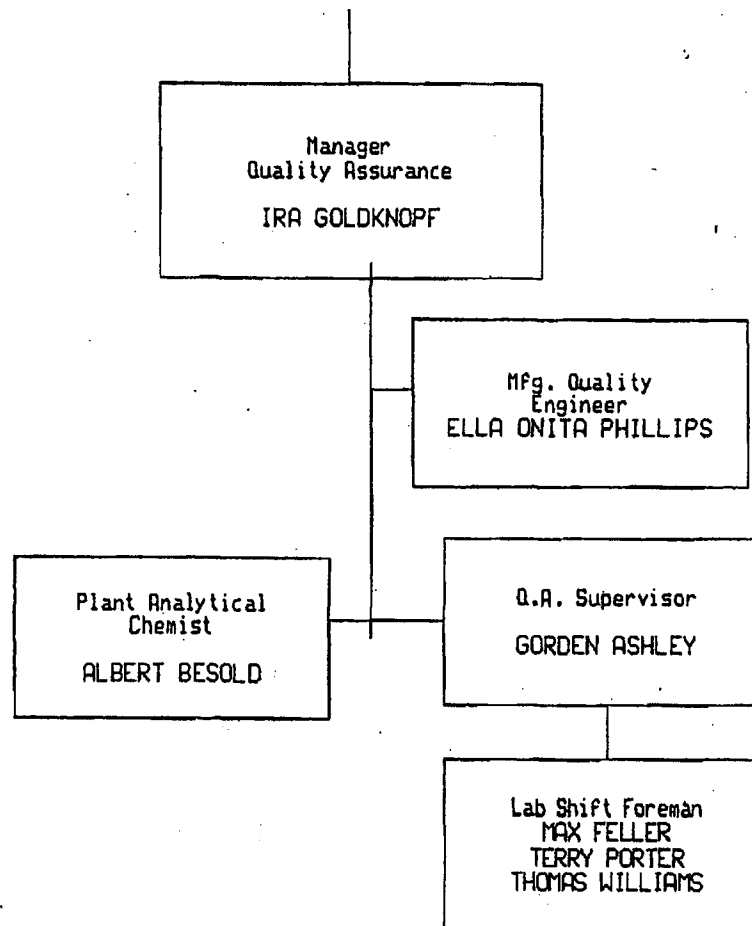
SEE CHEM. 2-6

Manager
PED
OMKAR KALIA

SEE CHEM. 11

CHEM. 14-1
CALVERT CITY PLANT
April 3, 1989

REPORTS TO
PLANT MANAGER, DIRECTOR OF MANUFACTURING.
CALVERT CITY
SEE CHEM. 14



CHEM. 14-2
CALVERT CITY PLANT
October 1, 1989

REPORTS TO
PLANT MANAGER - CALVERT CITY
DIRECTOR OF MFG. - POLYMERS
SEE CHEM. 14

Manager, Maintenance
and Engineering
DOUG FOSTER

Superintendent
Project Engineering
DENNIS MOORE

Sr. Project
Engineer
JOHN CASE

Sr. Maintenance
Engineer
NELSON BIBLE
RONALD COLEMAN
OPEN

Planning/Scheduling
MALCOLM WADLINGTON
HAROLD McDANIEL
VIRGIL CURTSINGER

Project Engineers
FRANK ROOL
WILLIAM KEMP

Maintenance
Superintendent
ROBERT BALDREE

Instrument
Foreman
JAMES LYNN

Elec. Foreman
SUE GRIGGS

Machine Shop
Foreman
MANUEL DIAS

M-1 Foreman
RANDLE PETWAY

M-2 Foreman
GORDEN THOMPSON

Maintenance
Foreman
WALLY MCGREGOR
ROBERT PUTTEET
JIM PROVANCE
MIKE KOBEL

CHEM. 14-3
CALVERT CITY PLANT
October 1, 1989

REPORTS TO
PLANT MANAGER- CALVERT CITY
DIRECTOR OF MFG. - POLYMERS
SEE CHEM. 14

Production Manager
DAVE WOMMACK

Superintendent
Specialties
FRANK NAGLE

Sr. Mfg.
Engineer
WILLIAM RUESSER

General Foreman
TROY WILHELM

Shift Foreman
HAROLD HENSON
SIDNEY SCOTT
WAYNE GREEN

Superintendent
Batch
DANIEL VIVES

General Foreman
MICKEY FILBECK

Shift Foreman
DAN CURRIN
JOHN FISER
DONALD DRAFFEN
GREGORY WYLES

Superintendent
Continuous
J. LEW PRATER

Sr. Mfg.
Engineer
DAN DICKENS

General Foreman
Training
GLYSON OVEY

General Foreman
RODNEY PHILLIPS

Shiftforeman
RALPH HARTSFIELD
ALBERT BRADLEY
JAMES ALVIS
WILLIAM ROSS
C. EVANS

CHEM. 14-4
CALVERT CITY PLANT
October 1, 1989

REPORTS TO
PLANT MANAGER - CALVERT CITY
SEE CHEM. 14

Manager
Personnel Relations
GUY KEALLY

Assistant
Personnel Manager
JIM CLAUS

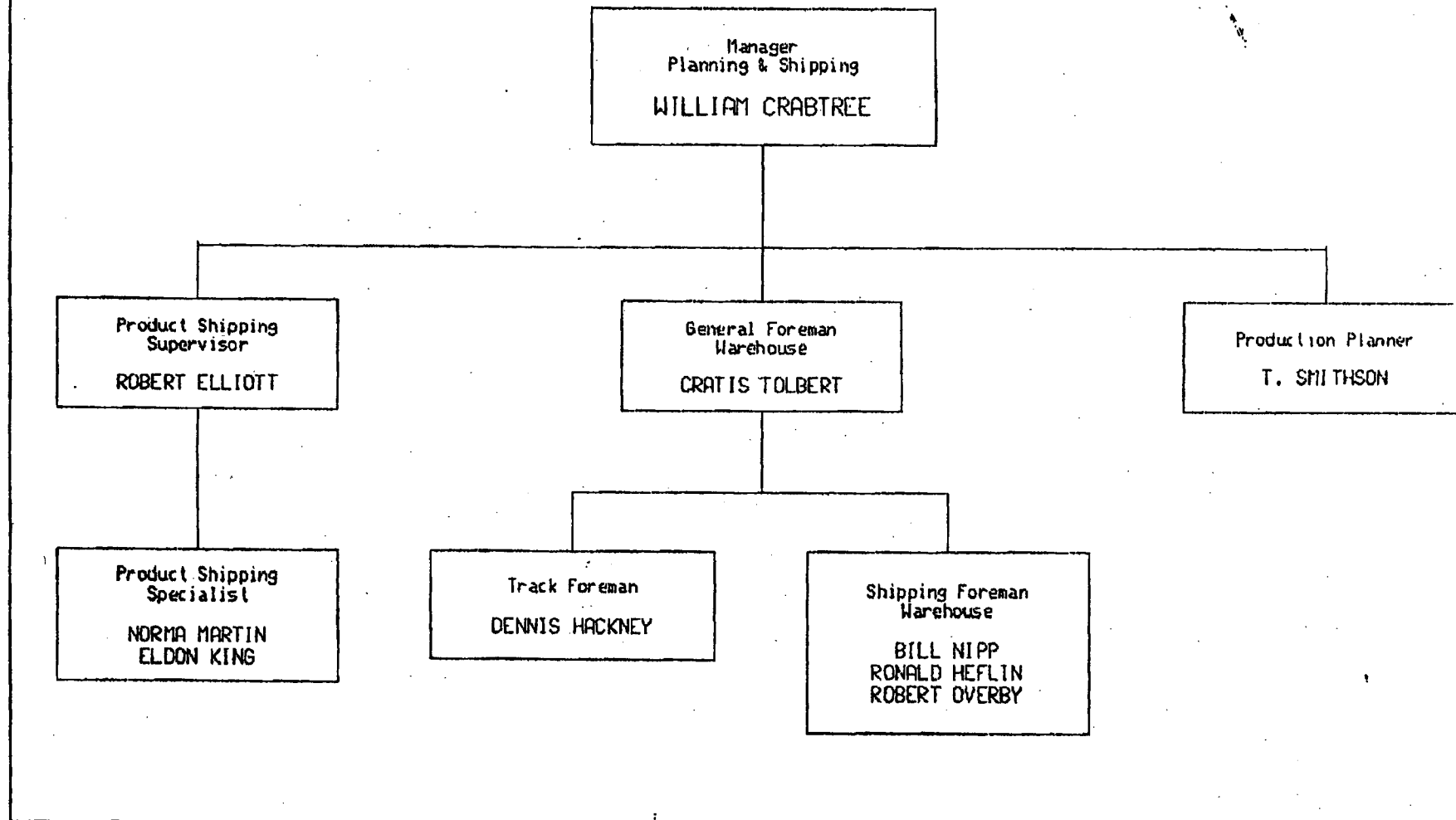
REPORTS TO
PURCHASING MANAGER
EQUIPMENT & CONTRACTS
SEE CHEM. 6-3

Purchasing Specialist
ANTHONY WATSON

Buyer
TAMARA EUBANKS

CHEM. 14-5
CALVERT CITY PLANT
January 1, 1989

REPORTS TO
PLANT MANAGER - CALVERT CITY
SEE CHEM. 14



CHEM. 14-6
October 1, 1989

REPORTS TO
PLANK MANAGER - CALVERT CITY
SEE CHEM. 14

Manager Safety and
Environmental
EARL BLAIR

Sr. Environmental
Engineer
JOHN WALTER

General Utilities
Foreman
GEORGE FAITH

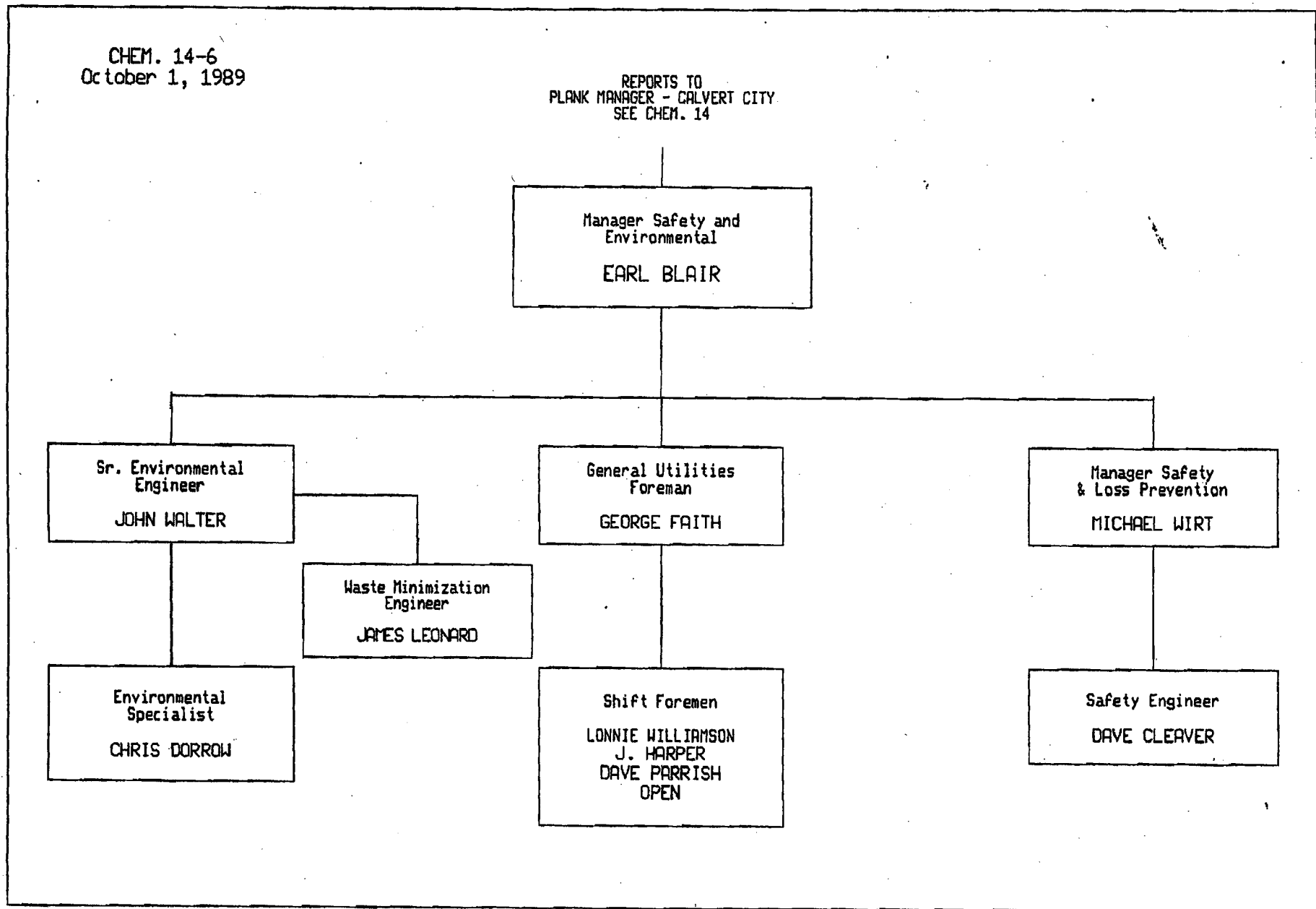
Manager Safety
& Loss Prevention
MICHAEL WIRT

Waste Minimization
Engineer
JAMES LEONARD

Environmental
Specialist
CHRIS DORROW

Shift Foremen
LONNIE WILLIAMSON
J. HARPER
DAVE PARRISH
OPEN

Safety Engineer
DAVE CLEAVER



CHEM. 15
CHARMIAN PLANT
August 7, 1989

REPORTS TO
DIRECTOR OF MANUFACTURING - GRANULES
SEE CHEM. 8-1

MANPOWER

Exempt	23
Nonexempt	10
Hourly	107
Total	140

Plant Manager
Charmian
WADE KEMP III

Coloring Super.
DALE ALDRIDGE

Coloring Foreman
JOHN STEM
THOMAS KUYKENDALL

Prod. Control Super.
JOHN CULLISON
ROBERT SITES

Loading Foreman
CHARLES SITES

Plant Engineer
DAVID BAKER

Safety Coordinator
DOUGLAS CRUMBACKER

Granule Super.
PAUL MOHN JR.

Quarry Foreman
CHARLES MOHN

Crushing & Milling
Foreman
STANLEY SANDERS
GERALD CAUFMAN
CHARLES POULSON
T. KUYKENDALL JR.

Quality Evaluation
Supervisor
AL ZARETSKIE

Maintenance
Superintendent
RONALD WHITE

Maintenance Foreman
GUY WEIKERT
RICHARD BUTTS
Planner/Scheduler
DAVID REISINGER

CHEM. 15-1
CHARMIAN PLANT
July 5, 1989

REPORTS TO
PURCHASING MANAGER
EQUIPMENT & CONTRACTS
SEE CHEM. 6-3

Purchasing Specialist
EDWARD KIPE

REPORTS TO
CONTROLLER, MINERAL PRODUCTS
SEE CHEM. 2

Plant Controller
GLEN HART

Accountant
T. MIDDLE

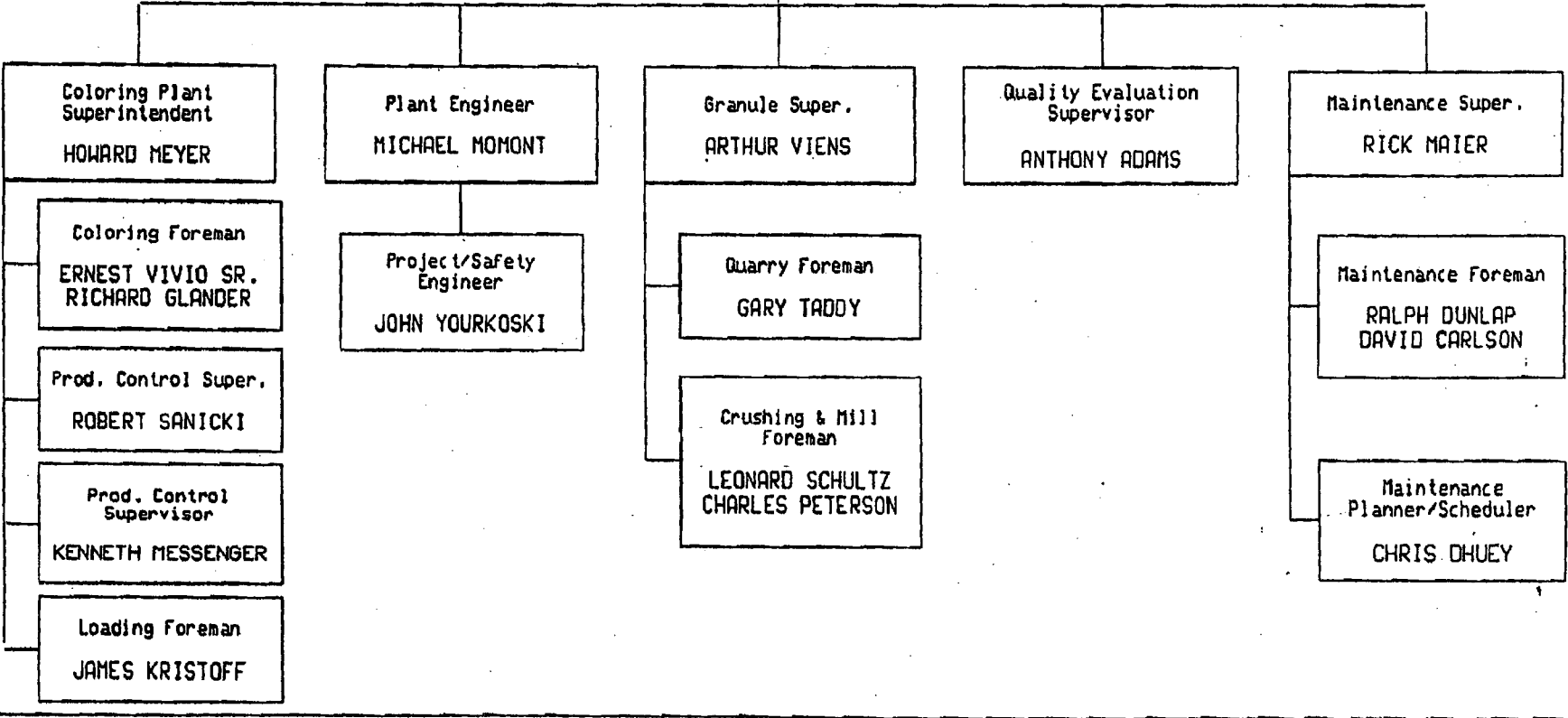
CHEM. 16
KREMLIN PLANT
April 3, 1989

REPORTS TO
DIRECTOR OF MANUFACTURING - GRANULES
SEE CHEM. 8-1

MANPOWER	
Exempt	22
Nonexempt	16
Hourly	91
Total	129

Plant Manager
Kremlin

DAVID DEGROOT



CHEM. 16-1
KREMLIN PLANT
April 3, 1989

REPORTS TO
CONTROLLER, MINERAL PRODUCTS
SEE CHEM. 2

Plant Controller
BERNICE ALEXANDER

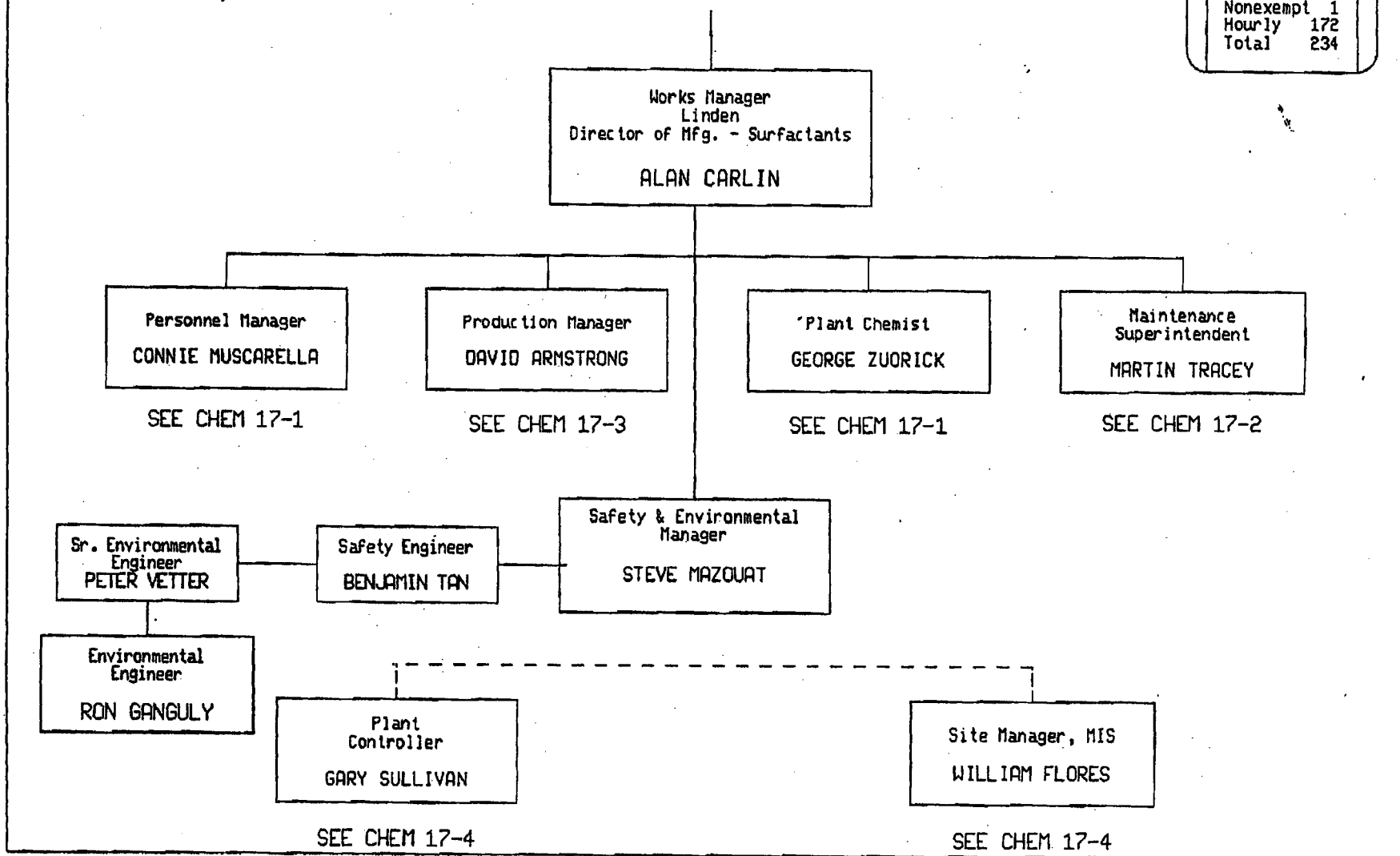
REPORTS TO
PURCHASING MANAGER
EQUIPMENT & CONTRACTS
SEE CHEM 6-3

Sr. Buyer
WILLIAM STEWART

CHEM. 17
LINDEN PLANT
October 1, 1989

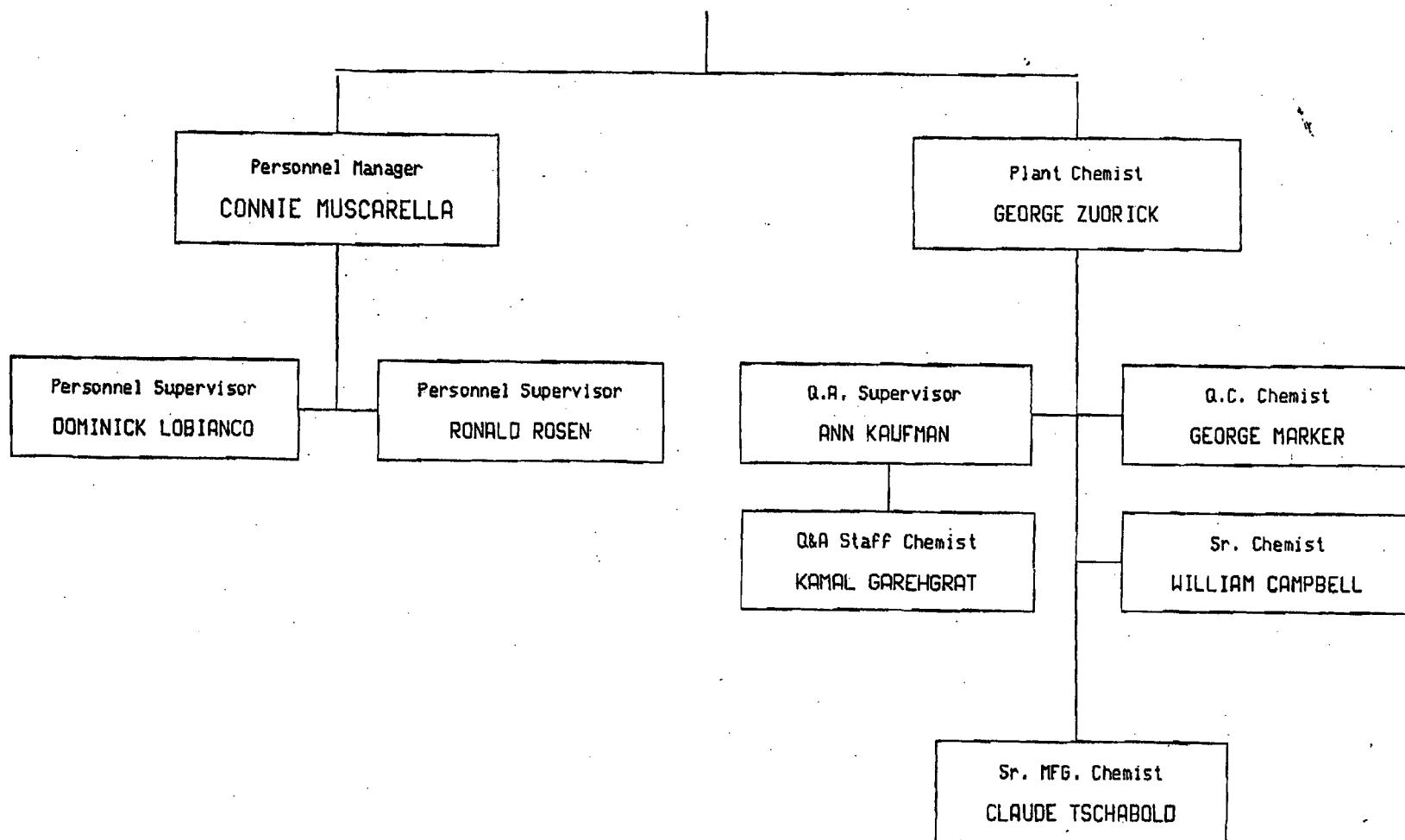
REPORTS TO
SR. V.P. & GENERAL MANAGER - SURFACTANTS
SEE CHEM. 7

MANPOWER	
Exempt	61
Nonexempt	1
Hourly	172
Total	234



CHEM. 17-1
LINDEN PLANT
October 1, 1989

REPORT TO
PLANT MANAGER - LINDEN
DIRECTOR OF MFG. - SURFACTANTS
SEE CHEM. 17



CHEM. 17-2
LINDEN PLANT
October 1, 1989

REPORTS TO
PLANT MANAGER - LINDEN
DIRECTOR OF MFG. - SURFACTANTS
SEE CHEM. 17

Maintenance Superintendent
MARTIN TRACEY

Maintenance
Area Foreman

HENRY KOLOOZIESKI

Chief Operating
Engineer

DAVE BOVE-acting

Electrical Instrument
Foreman

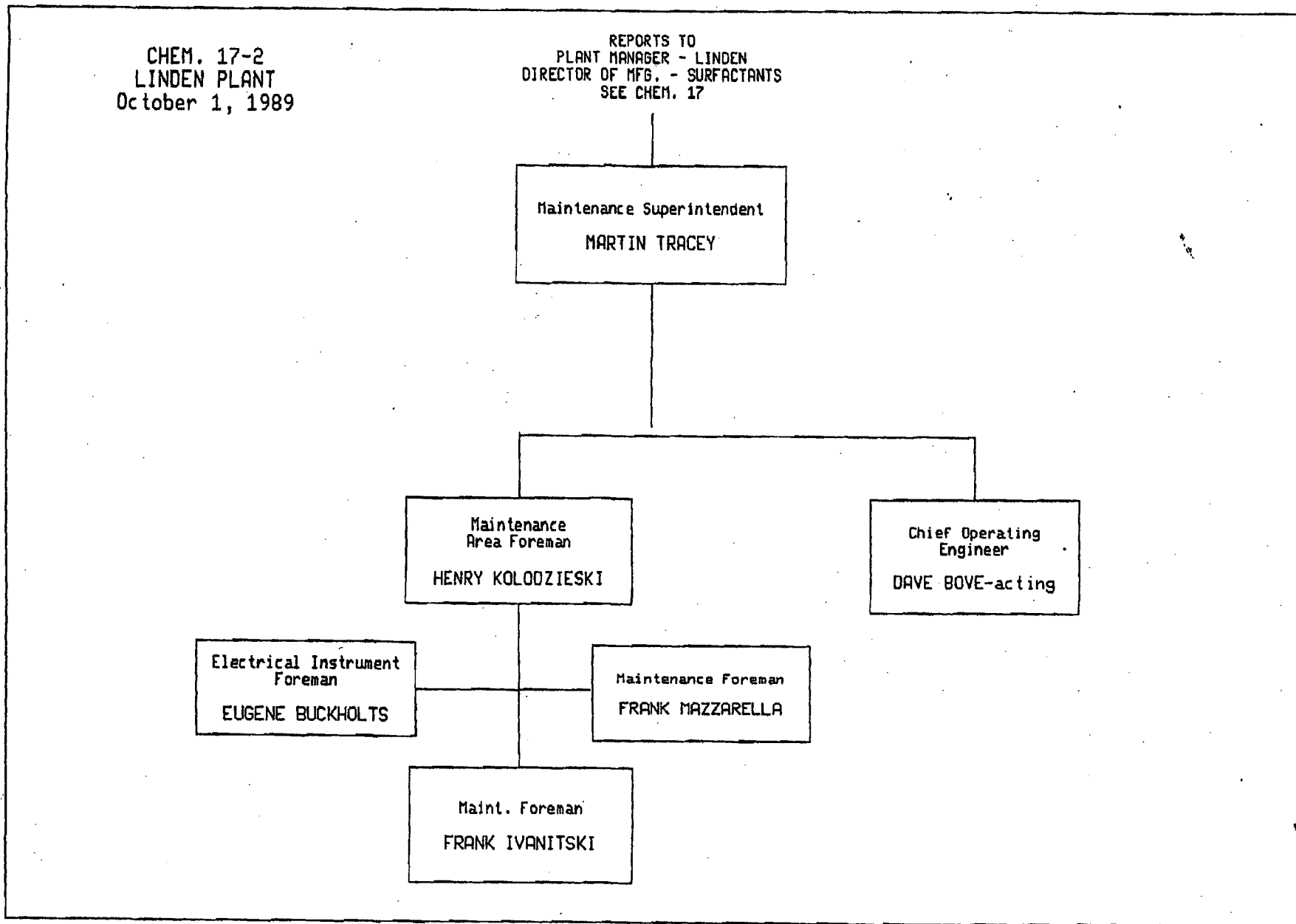
EUGENE BUCKHOLTS

Maintenance Foreman

FRANK MAZZARELLA

Maint. Foreman

FRANK IVANITSKI



CHEM. 17-3
LINDEN PLANT
October 1, 1989

REPORT TO
PLANT MANAGER - LINDEN
DIRECTOR OF MFG. - SURFACTANTS
SEE CHEM. 17

Production Manager
DAVID ARMSTRONG

Production
Superintendent
JOHN MAYER

General Foreman
JOE STRUNAK

Shift Foreman
GARY BERNARDINI
RICHARD FOTIA
FRANCIS DRAPCHAK
JOHN VANDERSTEEN

Shift Superintendents
ALBERT MACAOY
DONALD SOBOCIENSKI
ANANT JOSHI
VINCENT QUILBAN

Manager, PED
MO HEDE

Sr. Process
Engineer
SCOTT JOHNSON

Supervisor
Warehouse & Shipping
THOMAS COTTON

Product Shipping
Specialists
JOSEPH KOPEC

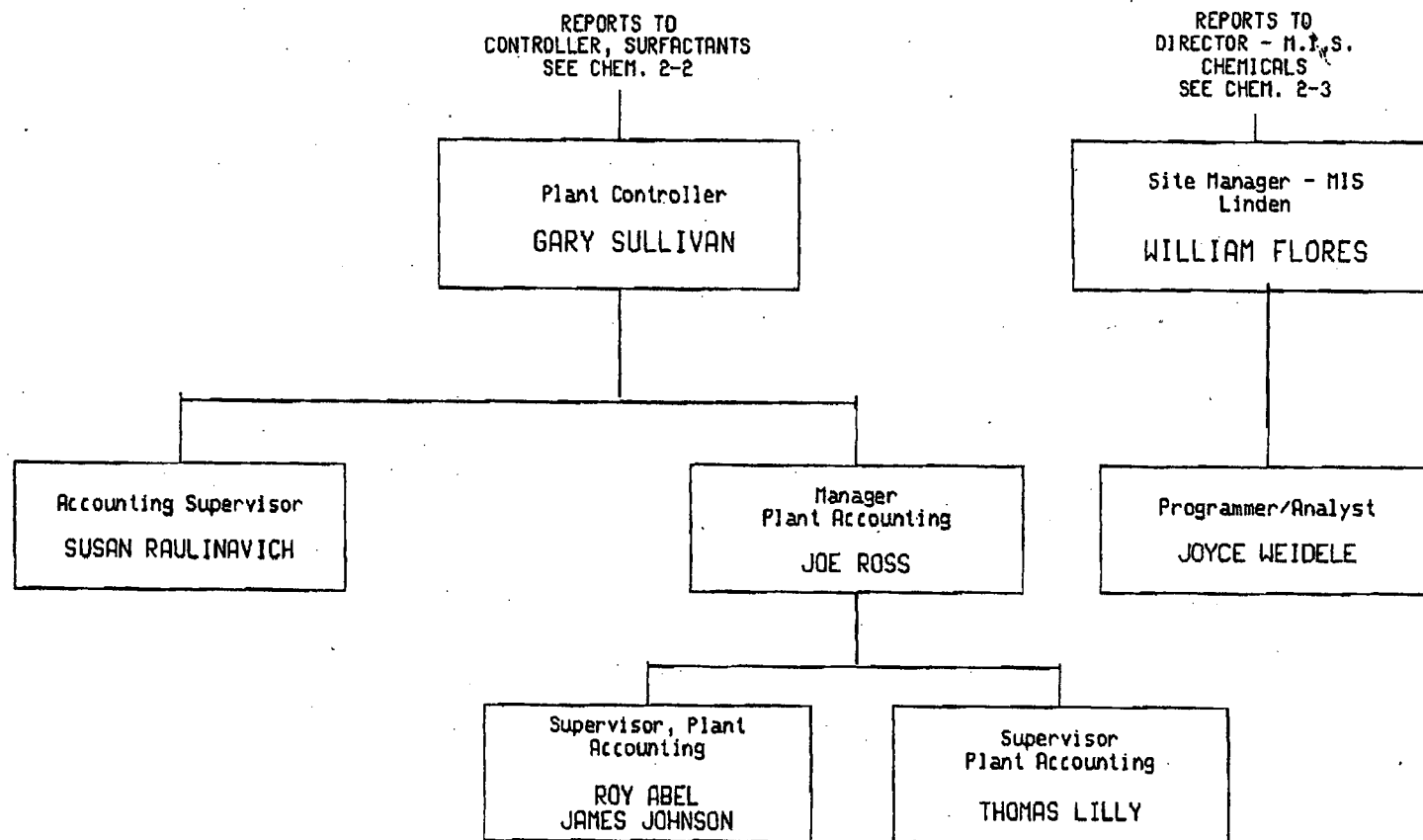
Supervisor, Corp.
Sample Department
RICHARD GILLIGAN

Shift Foreman
JOSEPH REMBISH
JOSEPH LOW
OTTO MAYER

Production Plan.
Supervisor
ROBERT HOPKINS

Inventory Planner
STEVEN GARDINER

CHEM. 17-4
LINDEN PLANT
October 1, 1989



CHEM. 17-5
LINDEN PLANT
August 7, 1989

REPORTS TO
DIRECTOR OF MANUFACTURING
SEE CHEM. 17

Manager, PED
ARNOLD SCHWARTZ

Sr. Process Engineer -
SCOTT JOHNSTON

CHEM. 18
SPARTANBURG
October 1, 1989

Reports to
SEE CHEM 17

MANPOWER

Exempt	7
Nonexempt	30
Hourly	4
Total	41

Plant Manager
Spartanburg
THOMAS DOVER

SEE CHEM. 6-3

Technical Manager
RICHARD KELLEHER

Quality Assurance
Supervisor
JAMES HUFFMAN

Purchasing
Specialist
MIKE HIXSON

Plant Engineer
GARY BURGESS

Office Manager
JEAN SMITH

Production
Superintendent
S.G. JOHNSON

CHEM. 19
TEXAS CITY/SEADRIFT
August 7, 1989

REPORTS TO
VICE PRESIDENT - MANUFACTURING
SEE CHEM. 4

MANPOWER	
Exempt	63
Nonexempt	3
Hourly	135
Total	201

Plant Manager
Texas City/Seadrift
Director of Mfg.
Intermediates & Solvents

RICHARD KEENAN

Manager, Maintenance
& Engineering

JOHN WULLSCHLEGER

Production Manager

MIKE BREAU

Manager
Quality Assurance

DAVID GENSHEIMER

Manager
Human Resources

MARGIE MONCRIEF

Environmental
Manager

WILLIAM JACOBS

Purchasing Specialist

GORDON BUCHORN

Safety Supervisor

BARNEY SMITH

Plant Controller

BUFORD HUDGINS

Plant Manager
Seadrift

DAVID HOWE

Envir.
Assistant
RICH ANDERSON

Supervisor, Planning
& Distribution

DOUG MANUEL

Safety Engineer

WAYNE SIMPSON

Plant Nurse

ANN CALK

Manager, PED
ABDI YAZDANI

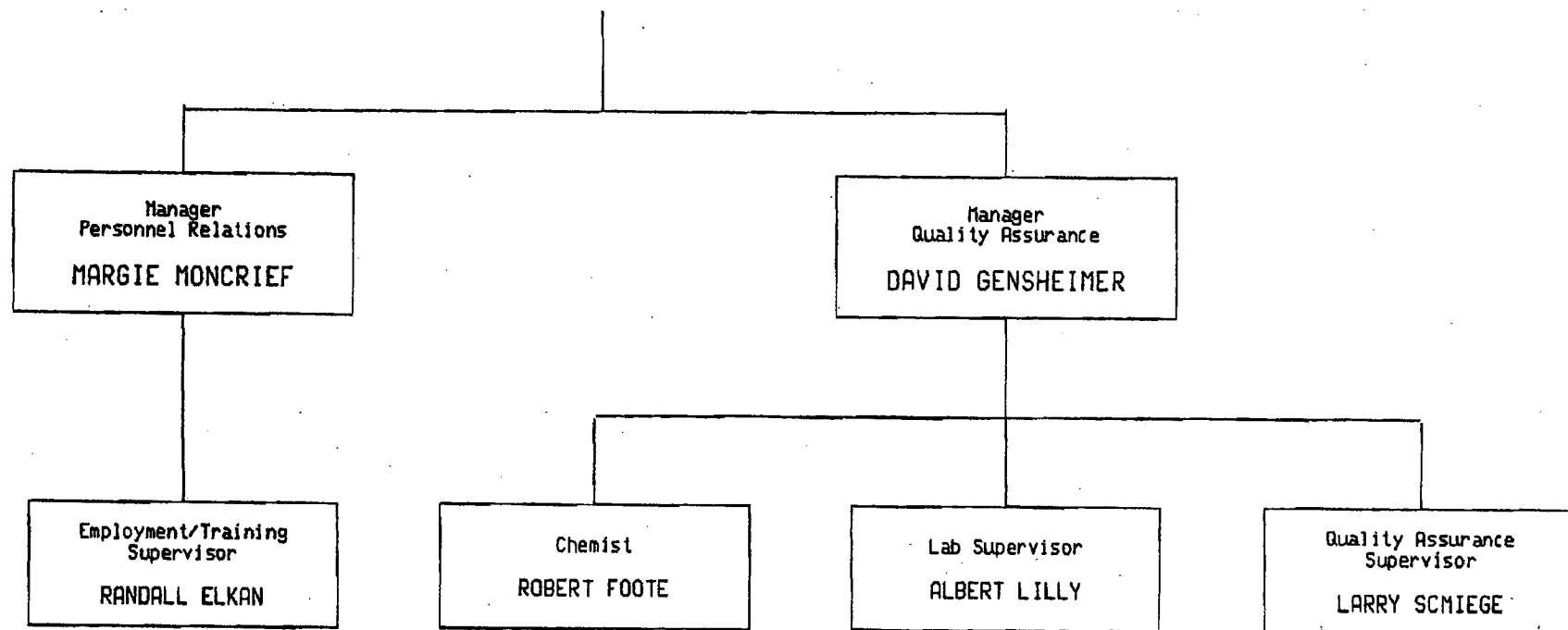
Site Project
Leader, MRP

LEE NASH

SEE CHEM 11

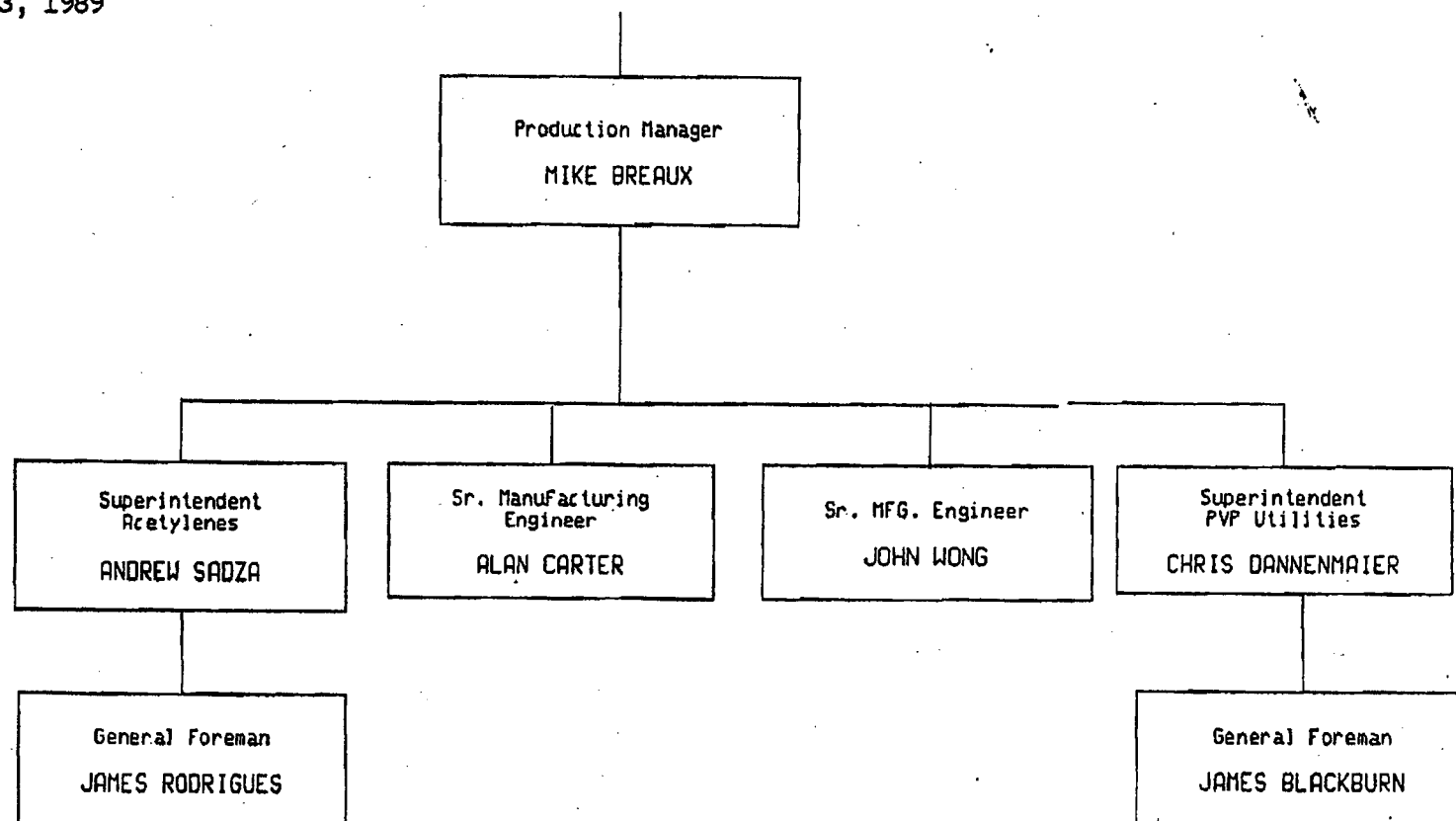
CHEM. 19-1
TEXAS CITY PLANT
October 1, 1989

REPORT TO
PLANT MANAGER - TEXAS CITY
DIRECTOR OF MFG. - INTERMEDIATES & SOLVENTS
SEE CHEM. 19



CHEM. 19-2
TEXAS CITY PLANT
April 3, 1989

REPORT TO
PLANT MANAGER - TEXAS CITY/SEADRIFT
DIRECTOR OF MFG. - INTERMEDIATES & SOLVENTS
SEE CHEM. 19



CHEM. 19-3
TEXAS CITY PLANT
August 7, 1989

REPORTS TO
CONTROLLER, ACETYLENES
SEE CHEM. 2-1

Plant Controller
BUFORD HUDGINS

Staff
Accountant
W. SHELBY POWELL

Manager
Plant Accounting
RICHARD PFAB

Manager
Plant Accounting
R. JOHNNY JONES

CHEM. 19-5
SEADRIFT PLANT
January 1, 1989

REPORTS TO
PLANT MANAGER - TEXAS CITY/SEADRIFT
DIRECTOR OF MFG. - INTERMEDIATES & SOLVENTS
SEE CHEM. 19

MANPOWER

Exempt	4
Nonexempt	2
Hourly	11
Total	17

Plant Manager
Seadrift Plant
DAVID HOWE

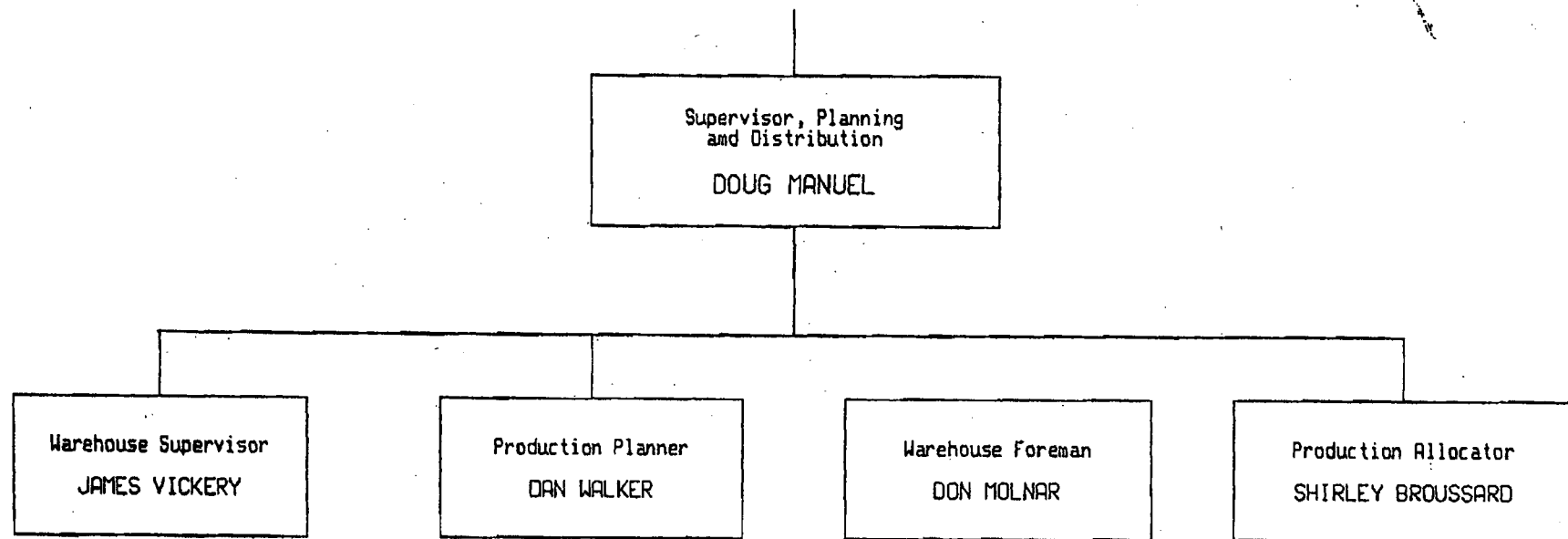
Maintenance Supervisor
GEORGE BINDEWALD

General Foreman
JIMMIE KIMBROUGH

Foreman
LLOYD MEYER

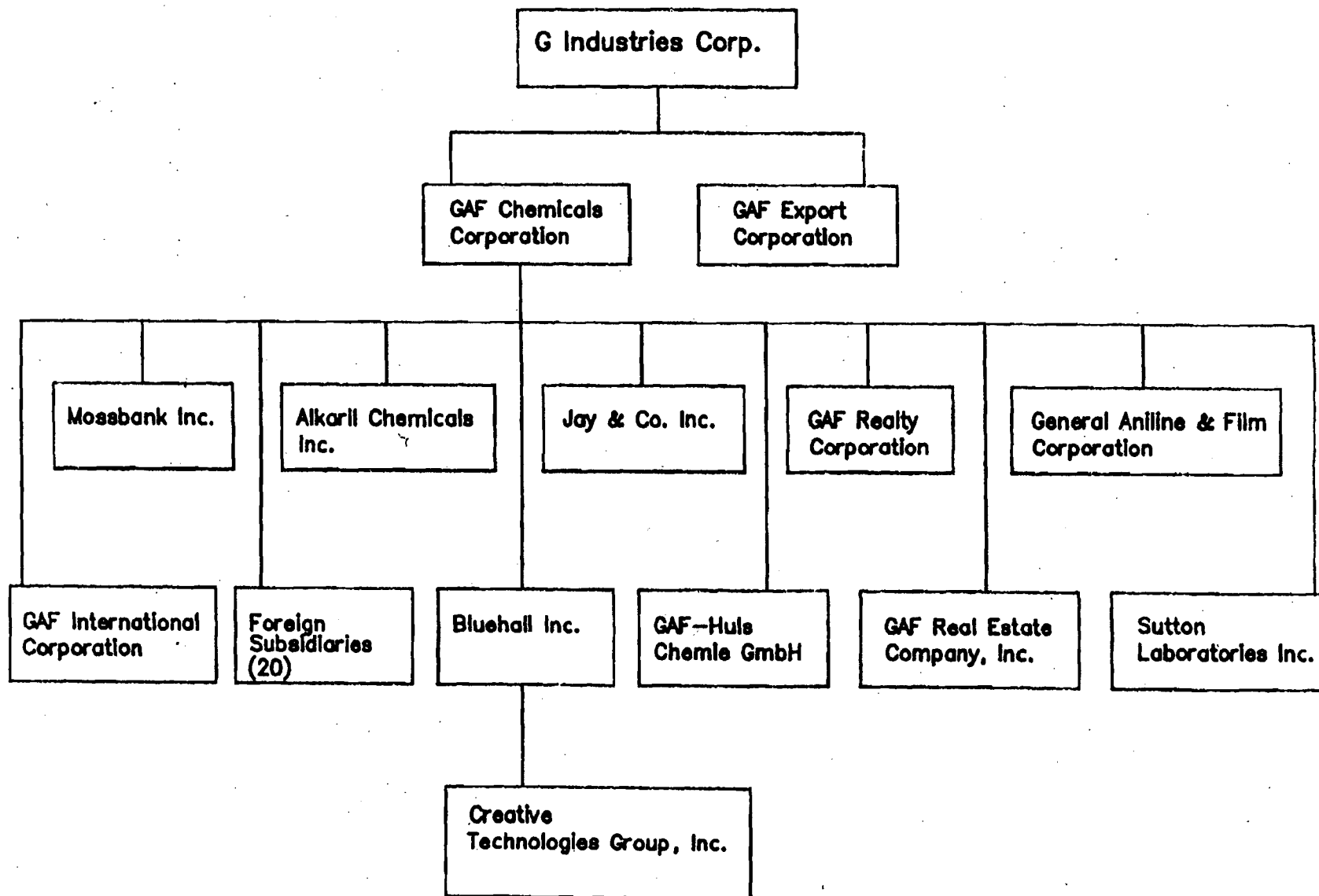
CHEM. 19-6
TEXAS CITY PLANT
January 1, 1989

REPORTS TO
PLANT MANAGER - TEXAS CITY
SEE CHEM 19



BLANK DIVDER

Corporate structure of the GAF chemicals business as of April 15, 1991.



BLANK DIVDER



Plan
**Microoffice
Correspondent**

To: Distribution
Location: Wayne

From:
Location: Deborah D. Lawson
Wayne/10

Date May 5, 1992
cc:

Subject: Liquidation of GAF Corporation (April 10, 1989)

I. BACKGROUND

Under the Internal Revenue Code, the distribution of assets in a liquidation will only be treated as tax free with respect to distributions to shareholders that own at least 80% of the common stock of the liquidating corporation. Therefore, in order to limit the tax liability created by the liquidation of GAF Corporation ("Old GAF") on April 10, 1989 (while preserving the separate corporate existence of each of Old GAF's businesses), at least 80% of the net fair market value of Old GAF had to be distributed to one shareholder which would then be treated as the successor of Old GAF for tax purposes.

To achieve this result, the five shareholders of Old GAF - GAF Chemicals Corporation (formerly Dorset Inc., "GCC"), GAF Building Materials Corporation (formerly Edgecliff Inc., "BMC"), Perth Inc., Merick Inc. and GAF Export Corporation (formerly Clover Inc., "Export") - approved a plan of liquidation (the "Plan of Liquidation") which transferred Old GAF's chemicals business and as many of Old GAF's other miscellaneous assets as possible (which were not otherwise necessary to the operation of, or reasonably related to, its building materials, broadcasting or insurance businesses) to GCC. Conversely, the Plan of Liquidation transferred to GCC only those liabilities which were related to Old GAF's ongoing chemicals business; all other liabilities which could be reasonably transferred to another shareholder were transferred to BMC, Perth, Merick or Export, and miscellaneous liabilities were divided pro rata among all the shareholders according to the percentage that the net fair market value of the assets and liabilities specifically assigned each shareholder in the liquidation bore to the total net fair market value of Old GAF as a whole.

The only exception to this approach was made for GAF Export Corporation ("Old Export") which handled chemicals sales made through or to Puerto Rico. Because it held Old GAF common stock

(which it had received upon conversion of certain Old GAF debentures in 1986), it had to merge into Old GAF prior to completion of the management-led buyout on March 29, 1989 so its Old GAF stock could be cancelled. Although its assets and liabilities could thereafter be transferred to and combined with GCC's, for tax reasons it could not be separately reincorporated as a subsidiary of GCC. Since tax planning dictated that the Puerto Rican operations be held separately from GCC's domestic operations, the assets and liabilities of Old Export had to be transferred to a different shareholder.

Following implementation of the Plan of Liquidation, the shareholders of Old GAF held the following percentages of net assets of Old GAF:

GCC	87.43655%
BMC	10.84552%
Merick (broadcasting)	1.43884%
Perth (insurance)	.26752%
Export	.01157%

The development of the liquidation strategy for Old GAF and the preparation of the Plan of Liquidation were handled by the Tax Department in conjunction with Steve Todrys of Kramer Levin. The specific distributions of assets and liabilities to the shareholders were determined by the Tax Department in conjunction with Valuation Research Corporation, which provided an opinion on the net fair market value of GCC following the liquidation.

A copy of the Plan of Liquidation and a set of charts showing the timing and mechanics of the liquidation of Old GAF (including the merger of GAF Building Materials Corporation ("Old BMC") and Old Export into Old GAF shortly before, and in facilitation of, the liquidation of Old GAF) is attached for your information.

II. DISTRIBUTION OF LIABILITIES

Specifically, the liabilities of Old GAF were distributed under the Plan of Liquidation as follows:

A. GCC

1. "All...liabilities, known and unknown relating to [Old GAF's] acetylene chemicals, surfactants, specialty chemicals, organometalics, mineral products, industrial filters and filter vessels businesses (collectively, the "Chemicals Businesses")." Although not expressly stated, this verbal formulation was intended to transfer only those liabilities related to the then ongoing operations of Old GAF's chemicals businesses so that liabilities of discontinued or sold operations such as film and dyes were not transferred to GCC.

2. The only exceptions to this scheme are specifically enumerated in the Plan and are the liabilities arising out of:

- (a) production of Amiben
- (b) Linden clean-up costs
- (c) environmental claims arising out of plants currently operating the Chemicals Businesses.

B. BMC

1. "All...liabilities, known and unknown, relating to its commercial and residential roofing materials business (except the mineral product business) including...the liabilities acquired by [Old GAF] as a result of and upon the merger of [Old BMC] into [Old GAF]...."

2. All asbestos-related liabilities of any type.

3. All liabilities arising out of:

- (a) shingle claims for discontinued products
- (b) plant shutdowns (any Old GAF business)
- (c) environmental claims from plants no longer operating (any GAF business)
- (d) environmental claims from oil waste pollution (any Old GAF business)

C. Merick (parent of GAF Broadcasting Company, Inc. and The Classical Shopper, Inc.)

"All...liabilities, known or unknown, relating to GAF Broadcasting Company, Inc. and The Classical Shopper, Inc." Since most of the liabilities of the broadcasting business were the direct liabilities of GAF Broadcasting and The Classical Shopper and not Old GAF, the liabilities of Old GAF which related to these two subsidiaries consisted primarily of the litigation related liabilities stemming from the Concert Radio case and Listeners Guild challenge to the FCC license.

D. Perth (parent of GAF Insurance Ltd.)

None.

E. Export

"All...liabilities, known and unknown acquired by [Old GAF] as a result and upon the merger of [Old Export] with and into [Old GAF] which include...all the...liabilities, known or unknown relating to its export business."

F. Joint and Several Liabilities

The Old GAF 10-3/8% Senior Subordinated Notes due 1994 and 11-3/8% Senior Subordinated Notes due 1995 were jointly and severally assigned to and assumed by GCC, BMC, Merick, Perth and Export. Among themselves, however, they are liable only for the percentage of the Notes represented by their net market value percentages set forth above.

G. Miscellaneous Liabilities

Each of the shareholders are also liable for their proportionate share (according to their net market value percentages set forth above) of all liabilities of Old GAF not otherwise allocated under the Plan including:

1. A \$5,170,300 intercompany note issued by Old GAF to G-I Holdings Inc. on March 29, 1989 (now cancelled).
2. Workers compensation and medical benefits for retirees and former employees of discontinued operations.
3. Insurance claims arising for the 1983-84 year during which Old GAF was self-insured.
4. Pension plan termination liabilities.
5. Redemption of Old GAF Preferred Stock.
6. Other legal claims (excluding all asbestos-related liabilities).

H. Liabilities Transferred by Operation of Law

As discussed above, only liquidating distributions to shareholders owning at least 80% of the stock of the liquidating company are tax free. Thus the distributions made by Old GAF to BMC, Perth, Merick and Export were taxable, albeit on a deferred basis. These deferred taxes were liabilities of Old GAF and, under the tax law, passed to GCC, as Old GAF's successor for tax purposes, upon Old GAF's liquidation.

III. SUBSEQUENT TRANSFER OF LIABILITIES

The liabilities distributed under the Plan of Liquidation can be transferred again by their recipients without restriction and without jeopardizing the original tax free treatment of Old GAF's liquidating distribution to GCC. At one point we talked about but never did transfer certain liabilities of BMC related to discontinued operations to GAF Corporation (formerly Newco Holdings Inc.). We did, of course, transfer certain liabilities

of GCC to International Specialty Products Inc. and its subsidiaries. Any additional transfer of liabilities would be accomplished in the same way the ISP transfer was done - by execution of an assignment and assumption agreement approved by the boards of directors of the companies involved. If the transfer of liabilities is made without consideration it would be treated as a capital contribution by the assuming corporation. The tax treatment of any such transfer would depend upon the structure of the transfer and would have to be separately analysed.


D.D.L.

Distribution

S.A. Block
S.J. Heyman
J.P. Rogers
R. Steinfeld
J.H. Stern
J.J. Strupp
A. Yancofsky

memos/miller

BLANK DIVDER



Interoffice Correspondence

To: S. Mazouat/Linden
Location:

From: W.S. Turetsky
Location:

Date: June 18, 1991
cc: W.E. Chambers
N.A. Kaye
J. Bizarro
A.J. ten Braak
L. Pasculli

Subject: SARA REPORTS/NEW PERMIT APPLICATIONS

As you know, on May 8, 1991 GAF Chemicals Corporation reorganized. As a result, International Specialty Products Inc. was created to operate the chemicals business. A number of subsidiaries were also created so that the owner/operator of your plant is now in the name given below.

According to Mr. L. Pasculli, for new reports, applications, etc. that you file, you should use the following names:

FACILITY NAME: ISP ENVIRONMENTAL SERVICES INC.
PARENT NAME : INTERNATIONAL SPECIALTY PRODUCTS INC.

The SARA 313 Report is the first item on your agenda. If appropriate, it is recommended that the following foot note be added after the above names:

"Effective May 8, 1991, this facility was transferred from GAF Chemicals Corporation to ISP Environmental Services Inc. in connection with a corporate reorganization."

As a final note, the new Dun and Bradstreet number for the parent company will be changed. This number, which must be reported in box 4.2 of the 313 form, will be furnished by the undersigned under a separate cover letter.

WST0496/bhk

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Exhibit B

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Authority For Expenditure

FORM 2811 7/87

Corporation Chemicals		Location Alkaril/Winder		Date July 1, 1989		AFE No. STF 1-89		
Title or Project Low Foamer, Biopal, Igepon Expansion								
Classification Check appropriate box		Estimated cost		Rate of Expenditure				
				Qtr	Year	Capital	Expense	Total
Replacement		X	Design	\$ 1,490,000	3rd	89	\$ 157,000	\$ 157,000
		X	Contracts	3,090,000	4th	89	392,000	392,000
Improve Operations			Materials	2,390,000	1st	90	785,000	785,000
Expansion-Existing Product		X	Labor	30,000	2nd	90	785,000	785,000
Expansion-New Product			Overhead	50,000	3rd	90	1,570,000	1,570,000
Pollution Control			Contingencies	510,000	4th	90	1,570,000	1,570,000
Safety & Health			Escalation		1st	91	1,570,000	1,570,000
			Taxes	80,000	2nd	91	785,000	785,000
Retirement			Capitalized interest	210,000	3rd	91	236,000	236,000
Gross Book Value					Total		\$ 7,850,000	\$ 7,850,000
Depreciation Reserve					Completion Time		21 Months	Completion Date
New Book Value			Total Cost	\$ 7,850,000				04/01/91
Less Salvage Value			AFE Budget Reference			Reference to Other AFE's or Projects		
Net Gain or (Loss)						STF 2-89, 3-89 & 4-89		

Authorization is requested to:

As a part of the Surfactant Task Force Phase II project and the Linden exit of all surfactant and specialties operations, this AFE is for the purpose of expanding the Winder site to produce the Thionyl Chloride capped Antarox line, Biopals and Igepons with their critical intermediates. The project will include four Glass Lined Reactors, a Methyl Taurine Unit, a T Slurry Unit, an expanded hot oil system and the necessary expansion to the current operations building to house the new equipment. In addition, the tank farm will be expanded by the addition of 10 storage tanks for key raw materials and finished goods. The necessary environmental controls (scrubbers, etc.) will be added to properly produce the products. Increased capacity will be built into the project to meet sales demands well into 1993.

The project cost as presented assumes Igepons will be produced using current technology. Work is on-going to define a direct process. If chosen, it could alter the current AFE estimate, but would be justified on its own merit.

This AFE is 1 of 4 being presented as part of the total \$24.1 million estimated to complete the exit of the Linden facility and the subsequent transfer of all production to other sites. The overall Phase II Plan has an Interval Rate of Return of 20.7% and a Payback of 5.7 years.

The details of STF Phase II and the specifics concerning this project are referenced in the STF "Redbook" (Jan. 1989) as well as the STF Phase II Report (May 1989). The economics of the total project are compelling because of an estimated \$8.6MM incremental savings in the first full year of operation. This increases the operating profit of the domestic business approximately 75% over the 1989 forecast.

Approvals:

Originator	Date	Plant Mgr/Mfg Dir	Date	Engineering	Date
	Date	VP Materials Mgmt & Tech Svs	Date	VP Finance	Date
VP Manufacturing	Date	VP Marketing	Date	President	Date
	Date		Date	Sr VP - CFO	Date
Vice Chairman	Date	Chairman - CEO	Date	Board of Directors	Date

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ISP



ISP

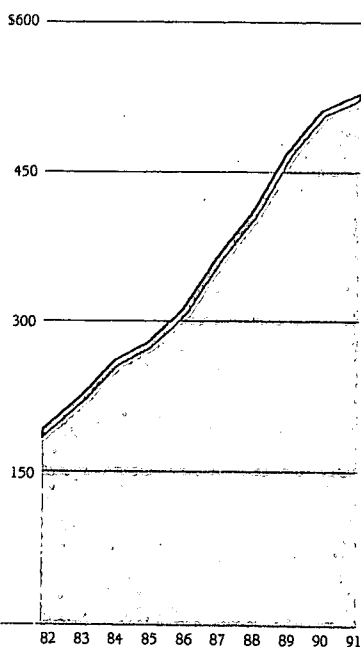
**FINANCIAL
HIGHLIGHTS**

(Thousands of Dollars, Except Per Share Amounts)

	1991	1990
Net sales	\$525,786	\$511,652
Operating income	\$140,522	\$133,056
Income before income taxes	\$ 78,968	\$ 45,323
Net income	\$ 50,855	\$ 30,768
Earnings per common share	\$.56	\$.38

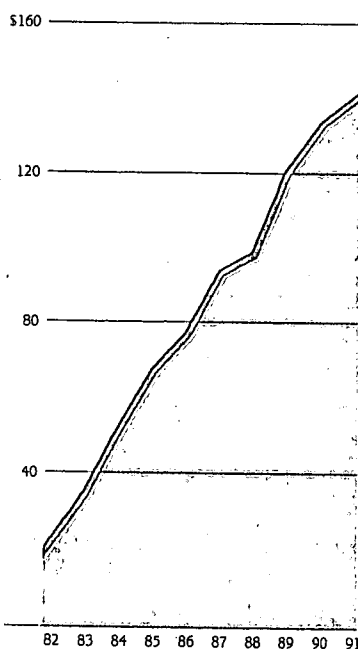
Net Sales

(In millions of dollars)

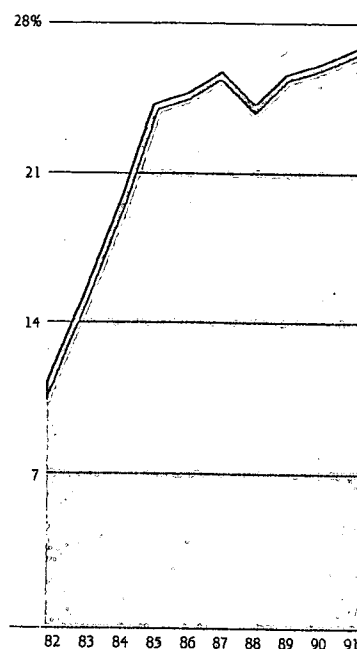


Operating Income

(In millions of dollars)



**Operating Income as % of
Net Sales**



CHAIRMAN'S MESSAGE

FELLOW SHAREHOLDERS:

It is with a sense of pride that we report on the Company's 1991 performance in my first Annual Message since ISP's initial public offering last July. For notwithstanding a difficult economic environment both in the United States and abroad, the Company recorded in 1991 its ninth consecutive year of increased sales and operating income while achieving a host of other accomplishments as well.

ISP's re-emergence as a public Company after more than two years of private ownership was motivated in large measure by our conviction that the increased operating and financial flexibility associated with a deleveraged capital structure would enable ISP to take full advantage of a wide range of attractive growth opportunities. And in this connection, ISP's future success should be measured by the extent to which we are able to successfully exploit these opportunities in the months and years ahead.

1991 FINANCIAL RESULTS

For the twelve-month period ended December 31, 1991, net income was \$50.9 million (56 cents a share), compared with net income of \$30.8 million (38 cents a share) for the previous year. Operating income increased from \$133.1 million in 1990 to \$140.5 million in 1991, while revenues were \$525.8 million compared with \$511.7 million in 1990.

For the fourth quarter of 1991, net income was \$10.2 million (10 cents a share) versus \$2.4 million (3 cents a share) for the 1990 period. Sales for the fourth quarter were \$122.4 million, compared with \$125 million for the same period a year earlier.

The Company's record breaking operating performance was attributable to a 7 percent increase in the operating income of specialty derivative chemicals (which was the result of an improved product mix and higher pricing as partially offset by additional selling, general, and administrative expenses, increased costs associated with new product programs, and an

unfavorable foreign exchange impact) and an 11 percent increase in the operating income of mineral products.

OTHER FINANCIAL HIGHLIGHTS

With one of the principal objectives of ISP's initial public offering being the deleveraging of the Company's capital structure, ISP was able, after applying the net proceeds of the offering (more than \$280 million) to pay down debt, to reduce its leverage ratio from more than 80 percent to slightly less than 50 percent. ISP's strong financial position was given recognition earlier this month when the Company successfully completed a public debt offering, consisting of \$200 million of seven-year, senior notes carrying a fixed interest rate of 9 percent.

The success of the bond offering, initially proposed in the amount of \$150 million and increased due to strong demand, provides evidence of ISP's favorable standing in the investment community. Moreover, we expect that ISP's remaining bank debt, which has been classified as an HLT (highly leveraged transaction) credit since ISP's parent, GAF Corporation, went private in March, 1989, will have its HLT designation removed at the end of the first quarter—thereby enabling ISP to refinance its remaining bank debt on more advantageous terms.

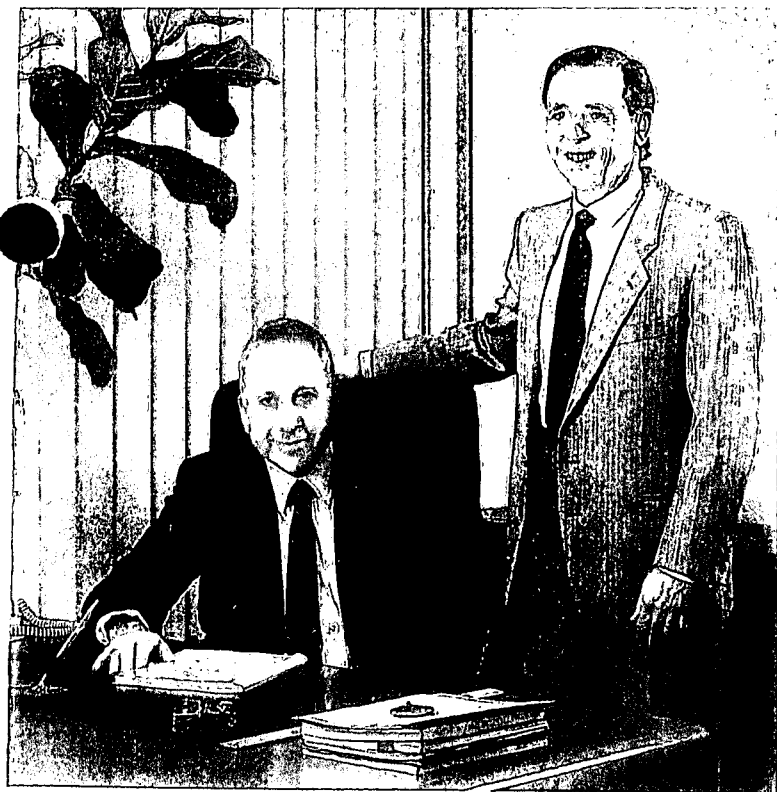
ISP'S GROWTH STRATEGY

ISP's future growth strategy is based on three principal elements:

- New products and new applications for existing products;
- Increased geographic penetration of overseas markets and the continued globalization of the Company's business; and
- A program to make niche acquisitions of businesses and product lines closely related to our own.

New Products and Applications

ISP substantially increased its commitment several years ago to its new product development program and



Samuel J. Heyman, Chairman of the Board and Chief Executive Officer (left), and Thomas C. Bohrer, President and Chief Operating Officer.

established as a strategic objective the goal of generating at least 25 percent of the Company's annual sales and profits from new products and applications developed in the prior five-year period. To that end, ISP continued to expand its research and development programs in 1991 and is currently in the process of hiring a substantial number of additional scientists, with the objective this year of increasing the size of its research and development staff by more than 15 percent. This not insubstantial increase comes on the heels of an average per annum increase in R&D expenditures since 1983 of more than 12 percent, and should help to sustain and indeed accelerate an R&D effort which is currently enabling ISP to develop one new product and some ten new applications each month.

Examples of several new products and applications developed this past year which should begin to make a contribution to sales and profits in 1992 are as follows: an exciting new application for ISP's line of environmentally sound solvents, Woodfinisher's Pride, a consumer paint and varnish remover for do-it-yourself homeowners, which has met with such enthusiastic consumer response that it is now being sold in more than 6,000 retail stores throughout the country; Gantrez® V, a

new and improved hair spray polymer, which provides faster drying times, improves curl retention, and reduces tackiness in hair spray formulations; ISP's new EPA-approved Agrimer™ product for use in pesticides to provide greater adhesion to foliage; and new innovative applications for ISP's PVP polymers for such diverse uses as providing sharper definition in the manufacturing of high definition television tubes and as a coating used in the manufacture of ultrafiltration membranes in connection with separation processes in the biotechnology field.

Growth of ISP's International Business

ISP's international sales have grown over the past eight years at an average annual rate of 20 percent, having increased from 26 percent of the Company's total sales in 1983 to almost 50 percent this past year. While ISP's European sales have been principally responsible for the growth of the Company's international business over this period of time, we believe that the Company's business in the Asia-Pacific region, Eastern Europe, and Latin America will begin to play an increasingly important role in ISP's continued growth. By way of example, ISP's operating income in the Asia-Pacific region grew at an average annual rate of 34 percent over the past five years and continued to grow at double digit rates this past year despite slowing economies in that area of the world.

To further the expansion of ISP's international business, the Company has opened over the past several years new offices in a substantial number of countries offering ISP attractive opportunities to participate in the continued development of Eastern Europe, Latin America, and, most significantly, the Asia-Pacific region of the world. Moreover, ISP's international business has developed to the extent that, in order to sustain and further its growth, we will be constructing additional manufacturing capacity in both Europe and the Far East. To this end, we expect to announce a decision with regard to the location of a new European manufacturing facility in 1992, while plans for a Far East facility should be concluded the following year.

ISP's Niche Acquisition Program

The current private sale market for specialty chemicals businesses, where acquisition prices today are substantially below levels which prevailed in the last half of the 1980s, offer, and will likely continue to do so for the next several years, unusually attractive opportunities for ISP. And while we have no intention whatsoever of making ISP into an acquisition vehicle, we do believe that there is an appropriate place in the Company's overall growth strategy for a limited, strategic acquisition program so long as it is consistent with ISP's credit quality objective, which is to continue to improve the Company's financial profile.

ISP's acquisition strategy is focused on niche type acquisitions with particular emphasis on the non-cyclical industries on which we are concentrating—cosmetics and personal care, pharmaceuticals and health-related products, and food and beverages. We expect these acquisitions to be synergistic in that they will either complement existing product lines, further the geographic reach of our businesses, or increase our market shares. Moreover, it is expected that any acquisitions made by ISP will involve businesses with similar characteristics to our own, involving high value-added products, leading market shares, significant barriers to entry, and product lines which not only complement ISP's own but can be expanded by use of the Company's technology, marketing expertise, and worldwide distribution network.

In line with the Company's acquisition strategy, we currently have several small acquisitions under serious consideration and should be in a position to announce one or more transactions as the year progresses.

OTHER DEVELOPMENTS

ISP's Environmental Services business continues to pursue regulatory approvals to permit the installation and operation of a hazardous waste disposal facility at the site of its former Linden, New Jersey, manufacturing plant. Administrative hearings on the Company's

application were concluded in early February, and a decision from the New Jersey Hazardous Waste Facilities Siting Commission is expected some time in the second quarter. We believe that the hearings went well and are cautiously optimistic as to the eventual outcome.

PROSPECTS FOR 1992

While 1991 was a year in which ISP registered respectable year-to-year increases in both operating profits and earnings, the Company's second-half performance was nevertheless below expectations, with lower sales of ISP products to industrial end-use customers offsetting continued growth in sales of higher value-added specialty products to the cosmetics and personal care, pharmaceutical, and food and beverage industries. And although this same trend will continue to influence the Company's first quarter operating performance, we are beginning to see signs which auger well for improvement over the balance of the year.

The performance of our business as the year progresses should be favorably influenced by, among other things, continued new product development, which should enable ISP to gain greater market penetration, particularly in the cosmetics and personal care industries; improving demand from the industrial sector where the Company's business has been adversely affected over the last year as a result of less than robust economic conditions; and continued growth of the Company's Asia-Pacific business.

While it is not our practice to issue earnings projections, I can assure you that management is committed to achieving substantial year-to-year earnings increases and, further, that we expect to meet that challenge in 1992. ISP's earnings performance this year should not only benefit from an improved operating performance, as described above, but will be positively influenced as well by substantially lower interest expense, resulting from both reduced levels of debt versus year ago levels and lower interest rates as a result of favorable credit market conditions.

ACKNOWLEDGMENTS

ISP's record of accomplishment over the past year was attributable to the exemplary efforts of so many members of the ISP community, and I am delighted to take public cognizance of their many contributions to the success of our common endeavor. Accordingly, we express appreciation to ISP's Board of Directors for its steadfast support and counsel, our customers whose business and long-standing loyalty we constantly strive to reciprocate in our dedication to providing products of the highest quality at the most competitive prices, and my fellow ISP employees who continue to manifest abilities, efforts, and a degree of intensity far beyond the ordinary in carrying out ISP's policies in the pursuit of our common objectives.

Deserving of particular mention in this message is Heinn F. (Tom) Tomfohrde, III, ISP's former President and Chief Operating Officer, who left the Company last year after almost five years of dedicated service. During Tom's tenure, he helped guide ISP's business to an extraordinarily impressive performance, and we are grateful for his inestimable contribution to our Company.

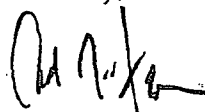
It has always been my view that one of the most telling signs of the health, vigor, and vitality of a business enterprise is not only the quality and enthusiasm of its existing employees but the degree to which it is able to recruit outstanding executives to the Corporation from the outside. And so I am particularly pleased that Tom Bohrer has joined ISP as President, Chief Operating Officer, and a member of the Company's Board of Directors. Tom is an outstanding executive, whom we have known and done business with for a number of years in his capacity as President of Hoechst-Celanese's Engineering Plastics business, and I am delighted that these pages afford me the opportunity to welcome him to our Company.

On a final note, it is worthy of mention that we have recently awarded stock options to not only the Company's managerial employees but all other salaried and certain hourly employees as well. While these awards represent less than one percent of ISP's

outstanding shares and therefore involve minimal dilution, they enabled almost two-thirds of our entire employee population to become ISP shareholders. This is of course over and above the ownership interest in ISP held by members of management through their holdings in GAF Corporation. The degree of employee participation in the ownership of our Company is highly unusual, if not unique, in corporate experience, and we believe that it contributes in no small measure to the creation at ISP of a corporate ethic in which employees treat the Corporation's money as if it were their own—as, in fact, it is!

We look forward in 1992 to a year of continued accomplishment.

Sincerely,



Samuel J. Heyman
Chairman of the Board
and Chief Executive Officer

March 9, 1992

INTRODUCING
ISP

Our name, International Specialty Products, describes who we are, a broad-based international Company that produces over 200 proprietary chemical additives and enhancers, each developed to increase the performance of thousands of different branded consumer, industrial, and agricultural end products. We supply ingredients that improve the performance of our customers' products, often giving them the unique characteristics that differentiate them from competitors' products. Because we identify with our customers, meeting their needs and those of their customers influences nearly every phase of the Company's operations, from research and development to sales and marketing.

In this section of the Annual Report, we will highlight our 1991 accomplishments, concentrating on our Specialty Derivative Chemicals and Mineral Products businesses. We will describe how we differ from other specialty chemical companies, illustrate the way we do research, review some of our new products and applications, and show the directions we're heading in a global marketplace.

Although our trademarks are not household names, our products are used in the processing of, or are listed as ingredients on, the labels of thousands of consumer products. Their benefits are noteworthy. Plasdone® polymers help improve the shelf-life of blood supplies; ShipShape® resin cleaner is used in the fiberglass boat industry as an alternative to volatile and flammable acetone cleaners; Polyclar® stabilizes and clarifies wine, beer, and other beverages; Gantrez® polymers help dentures adhere longer, stronger, and faster; and Agrimer™ polymers permit pesticides to adhere more readily to plants. These products, and hundreds more like them, make up the extremely broad geographic, customer, market application, and product base of our specialty derivative chemicals business.

While ISP's specialty derivatives represent only a small part of the cost of the ultimate product, they provide our





Success in today's
personal care market
depends on the
manufacturer's ability to
introduce products with
unique characteristics.
Gantrez[®] enhances the
performance of the active
ingredient in tartar
control toothpaste,
Advantage V facilitates
the reduction of volatile
organic compounds in
hairsprays, and
Stabilize[®] 06 thickens
shampoos and
hair conditioners.

customers' products with decided competitive advantages. In short, more than 6,000 customers worldwide benefit from ISP's versatility in adapting specialty derivatives for their specific applications.

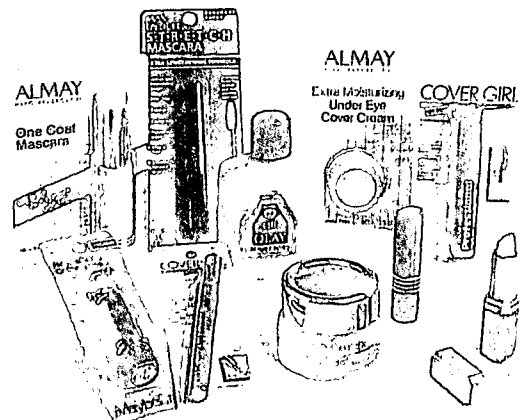
To achieve our goal of thoroughly understanding the needs of our customers and knowing how their products are used in the marketplace, we use many specialized techniques. We have, for example, a fully-equipped beauty salon to test new products in simulated customer formulations. We use focus groups to test products with professional hairdressers and beauticians. We conduct consumer product research to guide the direction of research and development, as well as brainstorming sessions to generate ideas that we present to our customers. And we initiate joint development partnerships with customers to meet mutual objectives. Because of our track record of innovation and quick response, customers turn to us first for solutions to their new product needs.


ISP'S
MARKET
DRIVEN
STRATEGY

"During the last several years, we have in our marketing strategy increasingly focused on our customers and their customers, thereby enhancing our role in fulfilling a wide range of individual consumer and societal needs," says James Potter, Vice President, Sales and Marketing.

The results of this evolution are a series of significant 1991 accomplishments:

- Specialty derivatives continued its decade of year-to-year worldwide sales growth.
- Our sales and marketing force grew geographically and was enriched by recruiting more personnel with expertise in our target product markets.
- We continued to get closer to customers by emphasizing the advantages of dedicated marketing groups that concentrate in major product application areas. Working with customers, we formed marketing teams which operate





*ISP's growing line of
specialty derivatives
provides cosmetics
worldwide their
key performance
characteristics. Our
Germall® and Sutocide®
preservatives protect
cosmetics and skin care
products from microbial
contamination. Ganex® is
the waterproofing agent
used in the preparation of
lipsticks and mascara.*

pro-actively with them on new product development and the introduction of end products.

- We formed even broader strategic alliances with a nucleus of select customers to work jointly on the development of new products. These alliances include U.S. and overseas research and development groups from both companies.
- We accelerated an already ambitious new product timetable established years ago by bringing to market 21 new specialty derivative chemical products and over 100 new applications.

SPOTLIGHTING ISP's PRODUCTS

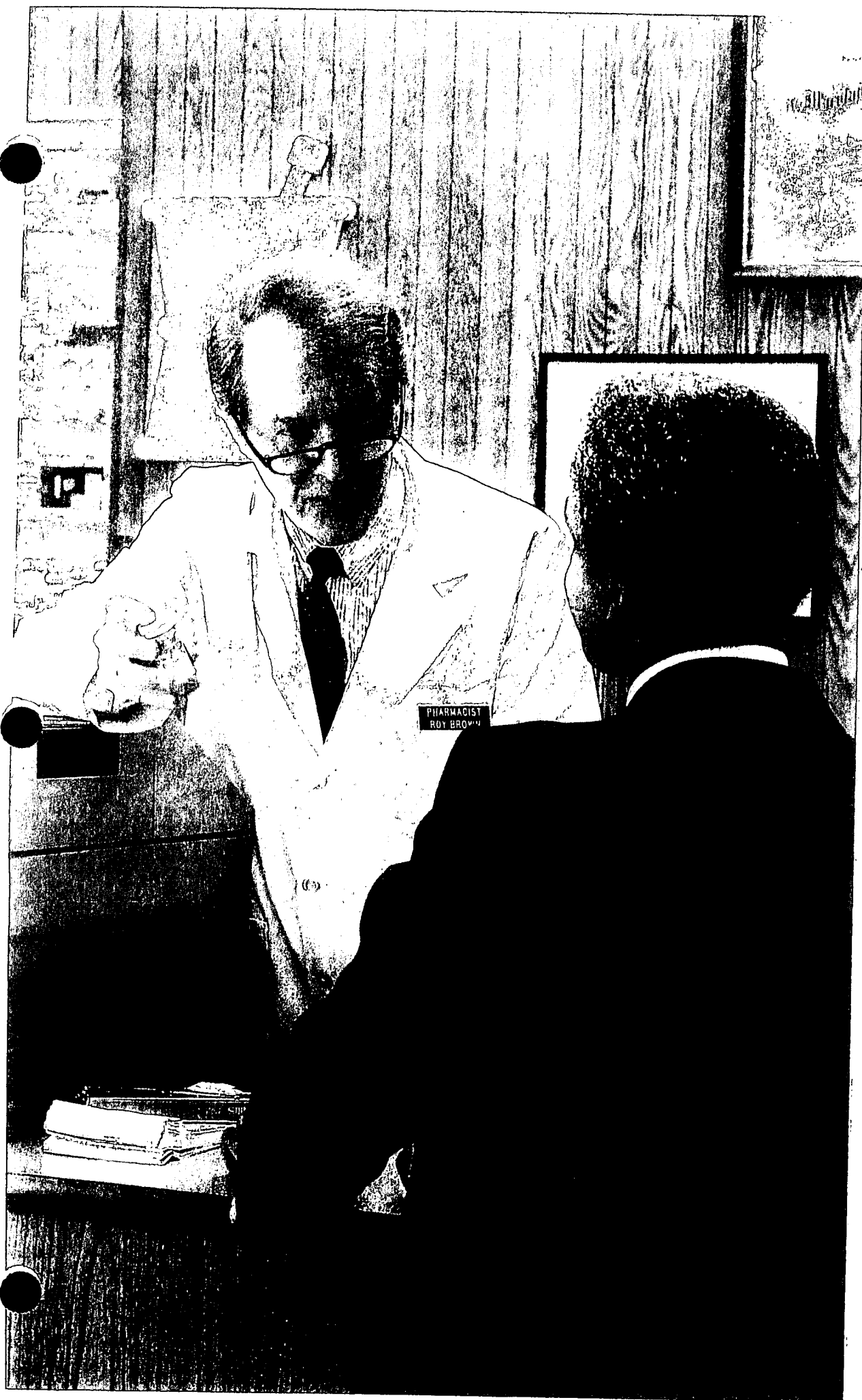
Our product strategy is to achieve leadership in multiple end user, niche markets. ISP products provide the distinctive characteristics that differentiate our customers' brands from others even though the ISP ingredients contribute only a small portion to the cost of end-products such as a six-pack of beer, can of hairspray, bottle of vitamins, or container of pesticide.

David Barton, Senior Vice President and General Manager, Specialty Derivative Chemicals, points out that "we aim to provide products which provide customers a competitive sales edge. When they have that advantage, our customers gain greater market share, and their success means our success."

Liquidone K-29/32, a polymer just introduced for pharmaceutical applications, is a good example of our niche marketing strategy. With Liquidone, cough syrups, chewable tablets, and lozenges have the same viscosity and "mouthfeel" as traditional syrup solutions, yet are non-caloric and alcohol and sodium-free.

To broaden our line of personal care specialty derivatives, we commercialized a polymer under the trademark of Stabileze® which prevents creams and lotions from separating or settling. Suttocide® A, a newly-introduced preservative, can be combined with Stabileze to produce a





ISP's Plasdone[®]

polymers are used in a broad variety of health care applications.

Plasdone is a binder and disintegrant in tablets, controlling the release into the body of the active ingredients in prescription and over-the-counter drugs and vitamins. It also prevents crystallization in cough syrups and other liquid medicines.

crystal-clear gel which gives a smooth feel on the skin and protects the product against spoilage.

Our family of PVP polymers and copolymers, marketed under such trademarks as Plasdone, Polyclar, Ganex, Gafquat, and Agrimer, is used in a broad range of applications, from pharmaceuticals to agricultural products to hair care products to coatings, beverages and detergent formulations. Two innovative applications for ISP's PVP polymers, developed last year, were for sharper imaging in the manufacture of high definition television tubes, and as an ultrafiltration membrane coating in biotechnology separation processes. The Gantrez line of copolymers is used extensively in applications from hairspray resins to denture adhesives and toothpaste.

Our pyrrolidone-based solvents are sold under such trademarks as M-Pyrol, ShipShape, PrintSolve, PrepRite, PartsPrep, FoamFlush, and MicroPure. These high performance engineered solvents are used in a broad range of applications from reaction solvents in manufacturing pharmaceuticals to industrial cleaning, stripping, and degreasing. The formulated solvents are tailored to specific end uses and are replacing many chlorinated solvents that have become environmentally unacceptable.

Butanediol is a raw material used in the production of ISP solvents and polymers. This material is also sold to customers as an intermediate in the manufacture of plastic resins used in the automotive, electronics, and appliance industries.

"ISP's versatile chemistry provides us with the ability to create new molecules tailored to meet specific application requirements," notes John Tancredi, Vice President, Research and Development. "The key is to capture the right idea and take it to the market as promptly as possible. In this respect, ISP has no peers. While other companies have to





ISP's Polyclar[®] is used in the processing of leading beers and wines throughout the world to ensure that they will remain crystal-clear. It is also being promoted for the same purpose in fruit juices and other clear beverages.

struggle to come up with new ideas, the flexibility of our base of specialty derivatives and the expertise of our scientists interact to create products that customers want. In hairsprays alone, ISP has 20 different resins. They can be fine-tuned for nearly every use. ISP excels in creating products and getting them to customers fast."

Acetylene, a highly reactive and flexible raw material, gives ISP, one of the few companies that has mastered this technology, the unique ability to create families of acetylene based products. Our research and development and manufacturing expertise supports our business objective of increasing the portion of revenues from new products. Our ultimate goal is to have 25 percent of our sales from products developed over the previous five years.

We applied during 1991 more demanding time reduction methods to our product development scheduling. While several years ago a new product might have taken five years from conception to delivery of production quantities, we have slashed this period to less than two years. A shorter development cycle permits ISP to deliver up to 100-pound samples to customers at a much earlier stage, an important factor when pharmaceutical and agricultural end products require governmental approval.

The product development cycle is often reduced even further. It took less than 18 months from the formulation of Stabileze to shipment of one-ton quantities to customers for test marketing in September 1991. And last year when even stricter volatile organic compound standards affecting all hairsprays became effective in California, we responded in less than six months with a new line of Gantrez V products, which not only allowed customers to meet these standards quickly, but provided faster drying times and improved curl retention.





The challenge in agricultural chemicals is to develop herbicides and pesticides which protect crops, yet are safe for humans and the environment. The superior adhesive qualities of ISP's just released family of 14 different EPA-approved Agrimer™ polymers allow farmers to reduce the required amount of pesticide while increasing its effectiveness.

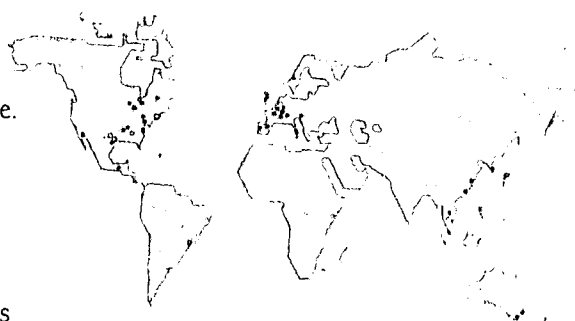
ISP is a global Company. Almost 60 percent of the sales of its specialty derivative chemicals are made in 72 countries outside the United States. We support our worldwide sales with an international distribution network that responds rapidly to customers' needs.

A key to success is to think and act globally. In this regard, ISP is structured to meet the marketing challenges of the 1990s. Over the past eight years, we have achieved an average annual growth rate of 20 percent in international sales. That momentum is due in part to the opening of sales and technical service offices in Hong Kong, Hungary, Ireland, Korea, the People's Republic of China, Portugal, Taiwan, and Thailand.

Our office in the People's Republic of China conducted in 1991 a series of seminars on the application of ISP resins in cosmetics, pharmaceuticals, beer, and agricultural chemicals. Three hundred Chinese scientists attended seminars on how to use ISP specialty derivative chemicals in pharmaceutical products.

We increased butanediol production in 1991 by 10,000 metric tons at GAF-Hüls Chemie GmbH, our German joint venture which we manage together with Hüls AG. We anticipate announcing plans in 1992 to construct a production facility to make specialty derivatives in Europe. We expect a similar announcement in 1993 for a plant in the Far East.

Consistent with our goal to attain larger overseas sales penetration, we expanded the size of our research facilities and staffing in Singapore and Guildford, England. Global marketing concepts have influenced other aspects of ISP's operations—the designation of marketing managers with worldwide product responsibility, strategic alliances with international consumer product companies, and even an automated voice mail system that operates 24 hours a day,





ISP's 2,000 employees in
the U.S. and overseas
represent a diverse mix of
professional and business
skills. Shown here
are (from left to right,
top to bottom):

ART JAMES
Chemical Operator
Chatham, New Jersey

JACKIE SOLOMON
Laboratory Manager
Chatham, New Jersey

ROGER KIBLER
Senior Laboratory Technician
Hagerstown, Maryland

MATT MACKEY
Laboratory Assistant
Chatham, New Jersey

MARGIE MORGAN
Senior Buyer/Expeditor
Wayne, New Jersey

SUSAN TSENG
Senior Research Chemist
Wayne, New Jersey

ELEANOR CARLSON
Shareholder Relations
Manager
Wayne, New Jersey

JAYANTI PATEL
Staff Chemist
Wayne, New Jersey

OLIVER HOLMES
Mill Operator
Charmian, Pennsylvania

WANDA KNABLE
Purchasing Clerk
Charmian, Pennsylvania

YUNG HUA CHEN
Senior Staff Engineer
Wayne, New Jersey

PAT CASEY
Order Supervisor/Customer
Service Representative
Chatham, New Jersey

seven days a week on a worldwide basis to speed and enhance communications.

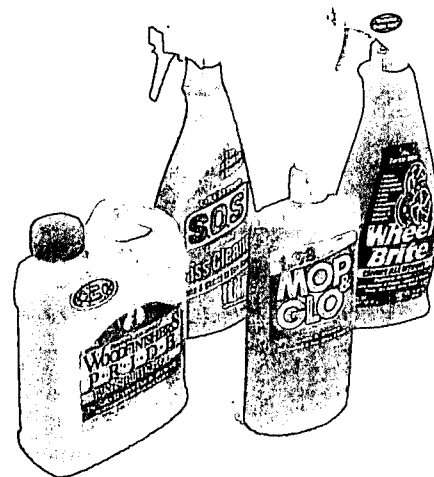
"Our worldwide organization is designed to fulfill the needs and objectives of many of our customers," says Ray Smith, Vice President, International. "They think globally. They develop consumer, industrial, and agricultural products for a worldwide market, and they expect ISP to support these global objectives as well."

ISP AND THE ENVIRONMENT

ISP develops products that must meet stringent environmental requirements, including the high standards set by California and regional, national, and international regulators. Health and safety is given a priority at ISP with toxicologists participating in all new product development teams. With growing frequency, ISP benefits from new environmental rulings that restrict or ban the use of other chemicals, particularly chlorinated solvents such as methylene chloride, an acknowledged animal carcinogen, the use of which in a number of applications has already been severely restricted, and which is currently being studied by the United States Consumer Product Safety Commission for a ban in consumer products.

Our basic chemistry results in products that are less volatile, less corrosive, and safer than many others being used. In order to satisfy changing governmental requirements, our customers must improve the safety of their end products, and in many instances ISP specialty derivatives have already been incorporated in newly formulated replacement products.

These growing environmental concerns led to the establishment of a focused marketing group called Engineered Products to concentrate on the formulation and development of safer solvents, designed for specific industrial stripping and cleaning applications, and for use in agricultural products.





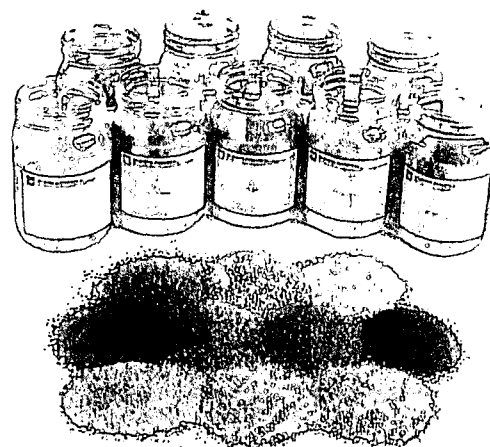
ISP's basic chemistry produces environmentally safer solvents, which are used in a broad range of household and industrial cleaners to replace chlorinated and other solvents, the use of which is becoming increasingly restricted. Stripping and cleaning woodwork is made easier and safer with Woodfinisher's Pride.

To complete the life cycle of these solvents, ISP provides its customers with an analytical service to characterize the waste stream prior to recycling. We make available a pick-up service to remove the used solvents to an off-site recycling center, or provide technical service assistance for on-site solvent recovery.

We expanded our sale of environmentally sound solvents in 1991 to include the principal ingredients in a new paint and varnish stripper, Woodfinisher's Pride, which because of its improved performance and safety, is in demand by do-it-yourselfers and professionals to replace harsher off-the-shelf consumer paint and varnish strippers, most of which contain methylene chloride. Only one year after market introduction, Woodfinisher's Pride has met with such enthusiastic consumer response that it is now being sold in more than 6,000 retail stores throughout the country.

**QUALITY
STANDARDS
AT ISP
MANUFACTURING
FACILITIES**

When ISP's Texas City plant received ISO 9002 certification in 1991 from the International Standards Organization, the facility became one of approximately 100 American plants to achieve this standard of excellence and only the 20th in the entire chemical industry. The ISO recognition is an accepted international measurement of quality that was established by the Geneva-based International Standards Organization. With this certification, customers know that quality products will be delivered every time, thereby increasing their confidence in the supplier. And in keeping with ISP's global marketing thrust, ISO certification represents a highly regarded standard by which European Economic Community companies can measure a plant's production standards.



**MINERAL
PRODUCTS**

ISP's Mineral Products business supplies colored granules to virtually every manufacturer of asphalt roofing shingles in the United States. Since more than 80 percent of roofing



ISP's colored, ceramic coated granules are critical components in the production of durable and decorative roofing shingles. Our granules improve the aesthetic properties of roofing products and make them more weather resistant and longer lasting. Since reroofing accounts for more than 80 percent of the demand for granules, ISP's Mineral Products business experienced continued sales growth in 1991 despite a low level of new housing starts.

shingles are sold for the replacement market, the Mineral Products business attained significant gains in 1991 despite a weak new home construction market.

ISP's Mineral Products business continues to benefit from two important roofing trends. First, roofing manufacturers are continuing to convert their shingle production from organic to glass fiber substrate, a product that requires 17 percent more granules. Second, substantially increased industry wide production of laminated shingles has accelerated the demand for granules. Compared with lower cost commodity roofing products, laminated shingles use 40 percent more granules. ISP Mineral Products is also the exclusive supplier of the product used in the construction of Har-Tru® all-weather tennis courts.

**FILTER
PRODUCTS**

ISP's Filter Products business expanded its product line of pressure filter vessels, filter bags and filter systems, to include a new line of cartridges and cartridge housings to process liquids in the biotechnology, cosmetic, and electronics industries. We also expanded geographically by entering the United States market with a dedicated sales force and a newly appointed distributor network. ISP filter products are used primarily to treat process liquids in the paint, automotive, chemical, and food and beverage fields.

**ADVANCED
MATERIALS**

Advanced Materials produces approximately 50 different grades of Micropowder™ iron used primarily in the aerospace and defense, electronics, powder metallurgy, pharmaceutical, and food industries. Much of the focus of Advanced Materials has been the defense industry where carbonyl iron powders in coatings give "stealth" characteristics to aircraft and naval ships. We also market Ferronyl® brand iron powder, which is used as an iron supplement in vitamins. The FDA-approved product is regarded by medical experts as safer than iron salts for use in vitamins.

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MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL
CONDITION AND RESULTS OF OPERATIONS

GENERAL

In July 1991, International Specialty Products Inc. (the "Company"), a newly formed indirect subsidiary of GAF Corporation ("GAF"), completed an initial public offering of 19,388,646 shares, or 19.4%, of its common stock, at an initial public offering price of \$15.50. The Company, through its subsidiaries, operates the businesses and owns substantially all of the operating assets formerly operated and owned by GAF Chemicals Corporation ("GCC"), its direct parent.

The Company was formed in 1991 to acquire, through a stock acquisition, substantially all of the operating businesses then conducted by GCC. GCC transferred (i) to newly formed subsidiaries, its assets and liabilities (other than those relating to certain investments and the capital stock of its existing subsidiaries), and (ii) to the Company, the capital stock of such newly formed subsidiaries, together with the capital stock of its existing operating subsidiaries.

GAF was acquired on March 29, 1989 in a management-led buyout (the "Acquisition") for a total price of \$1.4 billion. The capital structure and accounting bases of the assets and liabilities of the Company subsequent to and as a result of the Acquisition differ from those of the Company's business for periods prior to the Acquisition (the "Predecessor Company"). Consequently, in addition to interest expense incurred on Acquisition borrowings, the Company's results of operations subsequent to the Acquisition reflect non-cash charges that are not applicable to the Predecessor Company, consisting of goodwill amortization and depreciation of increased asset values resulting from the Acquisition. Such non-cash charges amounted to \$19.1 million, \$19 million and \$14 million for the year 1991, the year 1990 and the nine months ended December 31, 1989, respectively.

RESULTS OF OPERATIONS

The following table sets forth certain pro forma operating data for the year 1989, and historical data for the years 1990 and 1991. To facilitate the comparison of results for the three years, data for the year 1989 has been adjusted on a pro forma basis to reflect the Acquisition as if it had been completed on January 1, 1989. Accordingly, goodwill amortization, depreciation of increased asset values and interest expense related to debt incurred in the Acquisition have been reflected for the year 1989. The Company's investment in GAF-Hüls is reflected in the Company's financial statements using the equity method of accounting and the Company's share of the joint venture's earnings is reflected in operating income. See Note 12 of Notes to Consolidated Financial Statements.

(Dollars in Millions)	Historical		Pro Forma Year Ended December 31, 1989 (Unaudited)
	Year Ended December 31, 1991	Year Ended December 31, 1990	
Net sales	\$525.8	\$511.7	\$469.6
Operating income	\$140.5	\$133.1	\$115.9
Interest expense	(52.7)	(85.2)	(93.6)
Other income (expense), net	(8.8)	(2.6)	0.6
Income before income taxes	79.0	45.3	22.9
Income taxes	(28.1)	(14.5)	(13.3)
Net income	\$ 50.9	\$ 30.8	\$ 9.6
Operating margin	26.7%	26.0%	24.7%

1991 COMPARED WITH 1990

In 1991, the Company recorded its ninth consecutive year of increased operating income. Net sales increased by \$14.1 million (3%) to \$525.8 million in 1991 from \$511.7 million in 1990. Operating income was \$140.5 million in 1991, an increase of \$7.4 million (6%) over 1990. Net income increased by \$20.1 million (65%) to \$50.9 million in 1991 from \$30.8 million in 1990.

Specialty derivative chemicals and mineral products contributed to the increase in net sales. Net sales of specialty derivative chemicals increased by \$14.6 million (4%) as a result of higher volumes, an improved product mix, and higher pricing, partially offset by the unfavorable impact of foreign exchange rates. Net sales of mineral products increased by \$2.8 million (3%), due to higher selling prices.

The growth in the Company's operating income resulted primarily from a \$7.4 million (7%) increase in operating income of specialty derivative chemicals, due to the improvement in product mix and higher pricing described above. These gains were partially offset by additional selling, general and administrative expenses and increased new product costs and an unfavorable foreign exchange impact. The operating income of mineral products increased by \$2.2 million (11%).

Interest expense in 1991 was \$52.7 million, a decrease of \$32.5 million from 1990. The decrease was attributable to the repayment of \$299 million of bank debt in 1991, mainly from the proceeds of the initial public offering, and also to a general decline in prevailing interest rates and a reduction in the interest rate pricing provisions applicable to the Company's bank borrowings.

Other income (expense) is comprised of net investment income and other nonoperating and nonrecurring items of income and expense. For the year 1991, the Company had net other expense of \$8.8 million, compared with net other expense of \$2.6 million in 1990. The increased net expense in 1991 was due primarily to a one-time charge of \$3.8 million, representing the Company's portion of the costs in

connection with the termination of the GAF Equity Appreciation Plan upon completion of the initial public offering, and also to lower net investment income in 1991.

1990 COMPARED WITH PRO FORMA 1989

In 1990, the Company recorded its eighth consecutive year of increased operating income. Net sales increased by \$42.1 million (9%) to \$511.7 million in 1990 from \$469.6 million in 1989. Operating income was \$133.1 million in 1990, representing an increase of \$17.2 million (14.8%) over 1989. Net income increased by \$21.2 million to \$30.8 million in 1990 from \$9.6 million in 1989.

Specialty derivative chemicals, mineral products, filter products and advanced materials all contributed to the increase in net sales. Specialty derivative chemicals net sales increased \$31.9 million (8.7%) as a result of the favorable impact of foreign exchange rates of \$20 million; a combination of an improved product mix, new product introductions and higher pricing totaling \$7.8 million; and the inclusion of the full-year results of \$4.1 million of Sutton Laboratories, Inc. ("Sutton"), which the Company acquired in April 1989. Net sales of mineral products increased by \$6 million (7.8%), due to higher unit volumes.

The growth in the Company's operating income resulted primarily from a \$19 million (21.3%) increase in operating income of specialty derivative chemicals, due to the favorable net impact of foreign exchange rates of \$14.1 million, an improvement in margins totaling \$8.3 million attributable to product mix and new product introductions, and the full-year results of Sutton of \$2.4 million. These gains were partially offset by additional selling, general and administrative expenses and increased new product and applicable costs totaling \$5.8 million. The operating income of mineral products was unchanged as gains from higher sales volumes were offset by higher manufacturing costs.

Interest expense in 1990 was \$85.2 million, a decrease of \$8.4 million from the 1989 level. The decrease was attributable to a general decline in prevailing interest rates and a reduction in the interest rate pricing provisions applicable to the Company's bank borrowings.

Other income (expense) is comprised of net investment income and other nonoperating and nonrecurring items of income and expense. For the year 1990, the Company had net other expense of \$2.6 million, compared with net other income of \$6 million in 1989. The increased net expense in 1990 was due primarily to lower net investment income in 1990.

INCOME TAXES

The tax provision reflected in 1989 on a pro forma basis consists of foreign income taxes only. The effective tax rate, which is a function of the amount of income taxes paid in relation to income before income taxes, decreased from 1989 to 1990 because of a decrease in domestic losses from operations (for which no pro forma taxes are required) and a reduction in the effective tax rate on foreign operations due to foreign tax rate reductions.

The increase in the effective income tax rate from 32.1% for the year 1990 to 35.6% for the year 1991 was attributable to profitable domestic and foreign operations for which domestic and foreign income taxes were provided for 1991.

LIQUIDITY AND FINANCIAL CONDITION

The net proceeds of \$281.3 million from the initial public offering were paid by the Company to G Industries Corp. ("G Industries"), the parent company of GCC, to reduce the Company's intercompany note (the "Intercompany Term Note"). G Industries then used such funds to reduce its \$600 million bank term loan. The remaining term loan amortization payments (and thus the remaining Intercompany Term Note amortization payments) were reduced on a pro rata basis.

In March 1992, two domestic subsidiaries of the Company (the "Issuers") issued \$200 million of 9% Senior Notes (the "Notes") due 1999. The net proceeds from the issuance of the Notes were used by the Company to repay a portion of the Intercompany Term Note to G Industries, and by G Industries to repay a portion of the term loan under the Credit Agreement.

The Notes are general unsecured obligations of the Issuers. Upon issuance of the Notes, the Credit Agreement was amended, with the Issuers assuming G Industries' obligations under the Credit Agreement, including the term loan and the combined revolving credit/letter of credit facility (except for obligations related to letters of credit issued on behalf of GAF Building Materials Corporation, which are limited to \$40 million). In addition, all liens on assets of the Company securing the Bank indebtedness were released, with the result that the remaining Bank indebtedness and the Notes rank *pari passu*.

As a result of the foregoing, the Company's scheduled repayments of long-term debt for the year 1992 have been reduced to \$25.7 million.

During the year 1991, the Company generated cash flow from operations of \$47.3 million, which was \$3.6 million lower than net income, as \$39.3 million of depreciation, goodwill amortization and deferred taxes were more than offset by an increase in working capital of \$21 million, an increase in other assets of \$12 million mainly resulting from

undistributed equity in income from the GAF-Hüls joint venture, and a decrease in other liabilities of \$6.5 million resulting primarily from expenditures against plant shut-down reserves.

In 1991, the Company invested \$34.4 million in plant and equipment and approximately \$17.8 million in research and development, compared with \$35.6 million and \$16.3 million, respectively, in 1990. Such investments were funded principally by internally generated cash flow. Net cash used for financing activities in 1991 was \$22.1 million, including repayments of long-term and short-term debt totaling \$300.9 million, and dividends and distributions to GCC of \$27.7 million, mostly offset by proceeds of \$281.3 million from the initial public offering and by a capital contribution from GCC of \$25.3 million.

Fluctuations in the value of foreign currencies cause U.S. dollar translated amounts to change in comparison with previous periods and, accordingly, the Company cannot quantify in any meaningful way the effect of such fluctuations upon future income. This is due to the large number of currencies involved, the constantly changing exposure in these currencies, the fact that all foreign currencies do not react in the same manner against the U.S. dollar, and the complexity of intercompany relationships (including the Company's practice of purchasing Deutsche mark denominated butanediol from GAF-Hüls, which serves to offset in part the adverse effect on net sales and income of a stronger U.S. dollar). The Company has a policy to manage these exposures to minimize the effects of fluctuations in foreign currencies. Part of that management includes entering into foreign exchange contracts from time to time in order to hedge a portion of both borrowings denominated in foreign currency and purchase commitments related to the operations of foreign affiliates. Gains and losses on such contracts are deferred and amortization is included in the measurement of the foreign currency transactions hedged. Forward contract agreements require the Company and the counterparty to exchange fixed amounts of U.S. dollars for fixed amounts of foreign currency on specified dates. The value of such contracts will vary with changes in the market exchange rates. During periods in which the dollar has been strong, the Company has sought to maintain its foreign operating income in dollar terms by offsetting changes in exchange rates with price increases. There can be no assurance that if undertaken in the future, any such efforts will be successful.

The parent corporations of the Company, including GAF, G-I Holdings, G Industries and GCC, are essentially holding companies without independent businesses or operations and, as such, are dependent upon the cash flow of their subsidiaries, including the Company, in order to satisfy their

obligations. For a description of such obligations see Note 16 of Notes to Consolidated Financial Statements. In the event that such parent corporations were unable to meet their cash needs from sources other than the Company, they might take various actions, including, among other things, seeking to cause the Company to make distributions to stockholders by means of dividends or otherwise, cause the Company to make loans to its parent corporations or cause GCC to sell shares of common stock. The Company does not believe that the dependence of its parent corporations on the cash flows of their subsidiaries will have a material adverse effect on the operations, liquidity or capital resources of the Company.

Sales, operating income and identifiable assets by geographic area are set forth in Note 14 of Notes to Consolidated Financial Statements. For information with respect to historical income taxes, see Note 5 of Notes to Consolidated Financial Statements.

In December 1990, the Financial Accounting Standards Board (the "FASB") issued Statement of Financial Accounting Standards No. 106, "Employers' Accounting for Postretirement Benefits Other Than Pensions." See Note 9 of Notes to Consolidated Financial Statements for a discussion of the potential impact of this new accounting standard on the Company's financial statements. In February 1992, the FASB issued Statement No. 109, "Accounting for Income Taxes", which established financial accounting and reporting standards for the effects of income taxes. The new standard is effective no later than for the year 1993. The Company does not anticipate that the implementation of these pronouncements will have a material adverse effect on the financial position or net income of the Company.

The Company does not believe that inflation has had a material effect on its results of operations during the past three years. However, there can be no assurance that the Company's business will not be affected by inflation in the future.

SELECTED FINANCIAL DATA

Set forth below are selected consolidated financial data of the Company and the Predecessor Company. The capital structure and accounting bases of the assets and liabilities of the Company subsequent to April 2, 1989 differ from those of the Predecessor Company for prior periods as a result of the Acquisition. Financial data of the Predecessor Company are presented on a historical cost basis. Financial data of the Company reflect the Acquisition under the purchase method of accounting. Accordingly, financial data for periods subsequent to the Acquisition are not comparable to data for

periods prior thereto, because the periods subsequent to the Acquisition reflect interest expense on Acquisition borrowings as well as non-cash charges that are not applicable to the Predecessor Company, consisting of goodwill amortization and depreciation of increased asset values resulting from the Acquisition. Such non-cash charges amounted to \$19.1 million, \$19 million and \$14 million for the year 1991, the year 1990 and the nine months ended December 31, 1989, respectively.

(Dollars in Thousands)	Company			Predecessor Company			
	Year Ended December 31,		Nine Months Ended December 31,	First Quarter Ended April 2,	Year Ended December 31,		
	1991	1990	1989	1989	1988	1987	1986
Operating data:							
Net sales	\$ 525,786	\$ 511,652	\$ 354,677	\$114,885	\$406,735	\$362,075	\$310,768
Operating income	140,522	133,056	89,261	30,998	97,869	93,101	76,836
Interest expense	52,693	85,224	66,434	2,032	7,211	6,550	4,947
Income before income taxes	78,968	45,323	23,170	29,244	93,708	91,532	67,891
Net income	50,855	30,768	12,349	18,248	61,204	55,592	42,332
Other data:							
Operating margin	26.7%	26.0%	25.2%	27.0%	24.1%	25.7%	24.7%
Depreciation	\$ 19,719	\$ 18,780	\$ 11,995	\$ 2,314	\$ 8,689	\$ 7,767	\$ 9,625
Goodwill amortization	14,067	13,996	10,242	—	—	—	—
Capital expenditures	34,422	35,627	22,909	3,837	40,575	28,889	9,967
	Company			Predecessor Company			
	1991	December 31, 1990	1989		1988	December 31, 1987	1986
Balance Sheet data:							
Working capital	\$ 89,649	\$ 65,658	\$ 95,400		\$ 46,586	\$ 70,442	\$ 59,346
Total assets	1,074,724	1,064,496	1,057,794		339,653	328,235	254,955
Long-term debt	413,746	698,044	734,018		71,677	73,761	68,433
Stockholders' equity	484,372	154,987	143,921		122,131	118,231	73,302

CONSOLIDATED STATEMENTS OF INCOME

	Company			Predecessor Company
	Year Ended December 31, 1991	Year Ended December 31, 1990	Nine Months Ended December 31, 1989	First Quarter Ended April 2, 1989
<i>(In thousands, except per share amounts)</i>				
Net sales	\$525,786	\$511,652	\$354,677	\$114,885
Costs and expenses:				
Cost of products sold	268,255	269,040	194,012	64,391
Selling, general and administrative	102,942	95,560	61,162	19,496
Goodwill amortization	14,067	13,996	10,242	—
Total costs and expenses	385,264	378,596	265,416	83,887
Operating income	140,522	133,056	89,261	30,998
Interest expense	(52,693)	(85,224)	(66,434)	(2,032)
Provision for termination of Equity Appreciation Plan	(3,843)	—	—	—
Other income (expense), net	(5,018)	(2,509)	343	278
Income before income taxes	78,968	45,323	23,170	29,244
Income taxes	(28,113)	(14,555)	(10,821)	(10,996)
Net income	\$ 50,855	\$ 30,768	\$ 12,349	\$ 18,248
Earnings per common share	\$.56	\$.38	\$.15	N/A
Weighted average number of common shares outstanding	90,194	80,500	80,500	N/A

The accompanying Notes to Consolidated Financial Statements are an integral part of these statements.

CONSOLIDATED BALANCE SHEETS

(Thousands)	December 31,	
	1991	1990
Assets		
Current Assets:		
Cash and cash equivalents	\$ 10,085	\$ 19,317
Accounts receivable, less reserve:		
1991—\$2,221, 1990—\$2,433	72,023	80,775
Inventories	93,836	83,716
Other current assets	11,707	9,488
Receivable from related parties	6,587	3,421
Total Current Assets	194,238	196,717
Property, Plant and Equipment, net	338,737	324,037
Excess of cost over net assets of businesses acquired, net of accumulated amortization of \$38,305 and \$24,238, respectively	488,428	502,445
Other assets	53,321	41,297
Total Assets	\$1,074,724	\$1,064,496
Liabilities and Stockholders' Equity		
Current Liabilities:		
Short-term debt and current maturities of long-term debt	\$ 7,069	\$ 9,767
Current maturities of Intercompany Term Note	18,694	32,500
Accounts payable	36,507	38,289
Accrued liabilities	36,932	41,570
Income taxes	5,387	8,933
Total Current Liabilities	104,589	131,059
Long-term debt less current maturities	61,445	68,319
Intercompany Term Note	282,301	567,500
Borrowings under Intercompany Revolving Note	70,000	62,225
Deferred income taxes	39,058	33,526
Other liabilities	32,959	46,880
Commitments and contingencies		
Stockholders' Equity:		
Capital stock and additional paid-in capital	506,041	199,433
Excess of purchase price over adjusted historical cost of Predecessor Parent Company shares owned by Predecessor Parent Company stockholders	(63,483)	(63,483)
Retained earnings	23,160	—
Cumulative translation adjustment and other	18,654	19,037
Total Stockholders' Equity	484,372	154,987
Total Liabilities and Stockholders' Equity	\$1,074,724	\$1,064,496

The accompanying Notes to Consolidated Financial Statements are an integral part of these statements.

CONSOLIDATED STATEMENTS OF CASH FLOWS

(Thousands)	Company			Predecessor Company
	Year Ended December 31, 1991	Year Ended December 31, 1990	Nine Months Ended December 31, 1989	First Quarter Ended April 2, 1989
Cash and cash equivalents, beginning of period	\$ 19,317	\$ 18,309	\$ —	\$ 34,828
Cash Flows from Operating Activities:				
Net income	50,855	30,768	12,349	18,248
Adjustments to reconcile net income to net cash provided by operating activities:				
Depreciation	19,719	18,780	11,995	2,314
Goodwill amortization	14,067	13,996	10,242	—
Deferred income taxes	5,532	5,090	8,083	1,741
(Increase) decrease in working capital	(20,989)	(5,517)	(30,745)	(14,548)
(Increase) decrease in other assets	(12,024)	(658)	(3,443)	(2,194)
Increase (decrease) in other liabilities	(6,485)	(8,717)	22,108	(2)
(Increase) decrease in receivable from related parties	(3,166)	3,509	(7,278)	3,863
Other, net	(189)	2,326	(3,340)	379
Net cash provided by operating activities	47,320	59,577	19,971	9,801
Cash Flows from Investing Activities:				
Capital expenditures	(34,422)	(35,627)	(22,909)	(3,837)
Acquisition of Predecessor Company, net of cash acquired	—	—	(585,323)	—
Acquisition of Sutton Laboratories, net of cash acquired	—	—	(31,975)	—
Net cash used in investing activities	(34,422)	(35,627)	(640,207)	(3,837)
Cash Flows from Financing Activities:				
Proceeds from initial public offering	281,272	—	—	—
Increase (decrease) in short-term debt	(9,212)	1,008	(1,137)	2,285
Proceeds from debt incurred to acquire Predecessor Parent Company	—	—	611,144	—
Proceeds from debt financing	—	653,000	56,978	—
Repayments of long-term debt	(291,680)	(657,966)	(6,140)	—
Change in cumulative translation adjustment	(215)	11,610	7,427	(2,928)
Dividends and distributions to GCC	(27,695)	(31,312)	(30,301)	(18,248)
Capital contribution by GCC	25,336	—	—	4,149
Other, net	64	718	574	(238)
Net cash provided by (used in) financing activities	(22,130)	(22,942)	638,545	(14,980)
Net change in cash and cash equivalents	(9,232)	1,008	18,309	(9,016)
Cash and cash equivalents, end of period	\$ 10,085	\$ 19,317	\$ 18,309	\$ 25,812

CONSOLIDATED STATEMENTS OF CASH FLOWS (continued)

(Thousands)	Company			Predecessor Company
	Year Ended December 31, 1991	Year Ended December 31, 1990	Nine Months Ended December 31, 1989	First Quarter Ended April 2, 1989
Supplemental Cash Flow Information:				
(Increase) decrease in working capital items:				
Accounts receivable	\$ 8,752	\$ (1,228)	\$ (416)	\$ (17,946)
Inventories	(10,120)	(10,299)	(9,312)	3,368
Other current assets	(2,219)	3,531	(1,921)	(1,630)
Accounts payable	(1,782)	(6,581)	(1,223)	(2,123)
Accrued liabilities	(12,074)	8,044	(10,986)	(711)
Income taxes	(3,546)	1,016	(6,887)	4,494
Net (increase) decrease in working capital items	\$(20,989)	\$ (5,517)	\$ (30,745)	\$ (14,548)
Cash paid during the period for:				
Interest	\$ 55,577	\$ 93,544	\$ 61,920	\$ 1,807
Income taxes (including taxes paid pursuant to Tax Sharing Agreement)	25,211	8,443	9,625	4,761
Acquisition of Sutton Laboratories, net of cash acquired:				
Fair market value of assets acquired			\$ 32,907	
Purchase price of acquisition			(31,975)	
Liabilities assumed			\$ 932	

The accompanying Notes to Consolidated Financial Statements are an integral part of these statements.

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

(Thousands)	Capital Stock and Additional Paid-in Capital	Cumulative Translation Adjustment and Other	Retained Earnings
April 2, 1989	\$217,929	\$ —	\$ —
Net income	—	—	12,349
Translation adjustment	—	7,427	—
Dividends and distributions to GCC	(17,952)	—	(12,349)
December 31, 1989	\$199,977	\$ 7,427	\$ —
Net income	—	—	30,768
Translation adjustment	—	11,610	—
Dividends and distributions to GCC	(544)	—	(30,768)
December 31, 1990	\$199,433	\$19,037	\$ —
Net income	—	—	50,855
Proceeds from initial public offering	281,272	—	—
Translation adjustment	—	(215)	—
Dividends and distributions to GCC	—	—	(27,695)
Capital contribution by GCC	25,336	—	—
Unfunded pension liability	—	(168)	—
December 31, 1991	\$506,041	\$18,654	\$ 23,160

PREDECESSOR COMPANY

January 1, 1989	\$110,064	\$12,067	\$ —
Net income	—	—	18,248
Translation adjustment	—	(2,928)	—
Dividends and distributions to GCC	—	—	(18,248)
Capital contribution by GCC	4,149	—	—
April 2, 1989	\$114,213	\$ 9,139	\$ —

The accompanying Notes to Consolidated Financial Statements are an integral part of these statements.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE

1**FORMATION OF THE COMPANY**

International Specialty Products Inc. (the "Company") was formed on April 25, 1991 and is an 80.6% owned subsidiary of GAF Chemicals Corporation ("GCC"), which is a wholly owned subsidiary of G Industries Corp. ("G Industries"). The authorized capital stock of the Company consists of 300,000,000 shares of common stock (par value \$.01 per share) and 20,000,000 shares of preferred stock (par value \$.01 per share). On April 26, 1991, the Company issued 10 shares of its common stock to GCC in exchange for \$10.00. The Company acquired all the shares of the capital stock of the subsidiaries of GCC which own substantially all of GCC's operating assets. The Company and its subsidiaries also assumed GCC's liabilities related to such assets and certain intercompany notes (see Note 8). In connection with these transactions, the Company issued an additional 80,499,990 shares of its common stock to GCC and entered into certain agreements with its affiliates (see Notes 5, 8 and 11).

The accompanying consolidated financial statements have been prepared on a basis which retroactively reflects the formation of the Company, as discussed above, for all periods presented. Stockholders' equity, long-term debt and the related interest expense and income tax effect thereon have been reflected retroactively for each of the periods presented. Excess cash generated prior to July 1, 1991 has been reflected as dividends and/or distributions to GCC for all periods presented. Certain allocations between GCC and the Company have been reflected in the historical financial statements based on methods that management believes to be reasonable (see Note 11).

A predecessor company to GAF Corporation (the "Predecessor Parent Company") was acquired on March 29, 1989 in a management-led buyout (the "Acquisition"). Newco Holdings, Inc. (which subsequently changed its name to GAF Corporation) ("GAF"), together with its wholly owned subsidiary, G-I Holdings, Inc. ("G-I Holdings"), and its wholly owned subsidiary, G Industries, were established to effect the Acquisition. The total Acquisition consideration of \$1.423 billion was financed in part by the Predecessor Parent Company's cash on hand and by borrowings from banks and others. The original bank borrowings were replaced by a long-term financing arrangement in September 1990 (see Note 8).

The Acquisition was accounted for under the purchase method of accounting. Accordingly, the historical book values of the assets and liabilities of GCC's predecessor company prior to the Acquisition (the "Predecessor Company")

were adjusted to their fair values, as estimated at March 29, 1989. As a result, an excess of cost over net assets of businesses acquired ("goodwill") related to the Company of \$498.9 million was recorded. Such amount was based on the excess of the Acquisition consideration allocated to the Company over the estimated fair market value as of March 29, 1989 of the assets and liabilities of the Company.

Since certain members of the management group beneficially owned shares of the Predecessor Parent Company's common stock before the Acquisition and own shares of GAF after the Acquisition, the purchase method of accounting does not apply to their shares of the Predecessor Parent Company. Accordingly, for accounting purposes, stockholders' equity reflects the total shares of the Predecessor Parent Company owned by the management group at their respective adjusted historical costs, reduced by the consideration paid by GAF for the Predecessor Parent Company shares owned by the management group (including payments by the Predecessor Parent Company to cancel outstanding options for stock of the Predecessor Parent Company), resulting in a total reduction in stockholders' equity of \$72.6 million, computed as shown below, of which \$63.5 million was allocated to the Company based on the ratio of the fair value of the Company's net assets to the total Acquisition consideration.

(Thousands)

Aggregate actual historical cost (to the management group) of the Predecessor Parent Company shares owned by the management group	\$ 23,621
Management group's proportionate share of the Predecessor Parent Company book value	65,727
Adjusted historical cost (to the management group) of the Predecessor Parent Company shares owned by the management group	89,348
Less: consideration paid by GAF to the management group for the Predecessor Parent Company shares owned by the management group	(161,953)
Excess of purchase price paid by GAF to the management group for the Predecessor Parent Company shares over the adjusted historical cost (to the management group) of the Predecessor Parent Company shares owned by the management group	(72,605)
Less: amounts related to other affiliates	9,122
Amount related to the Company	\$ (63,483)

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE

2**INITIAL PUBLIC OFFERING**

In July 1991, the Company completed an initial public offering of 19,388,646 shares, or 19.4%, of its common stock, at a price of \$15.50 before underwriters' discount. The net proceeds of \$281.3 million from the initial public offering were paid by the Company to G Industries to reduce the Company's Intercompany Term Note (see Note 8). G Industries then used such funds to reduce its \$600 million bank term loan. The remaining term loan amortization payments (and thus the remaining Intercompany Term Note amortization payments) were reduced on a pro rata basis.

NOTE

3**SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES*****Principles of Consolidation***

The accounts of all of the Company's subsidiaries are included in the consolidated financial statements. All significant intercompany transactions and balances have been eliminated. The 50% ownership of a foreign chemical manufacturing company is accounted for by the equity method (see Note 12).

Cash Equivalents

The Company considers highly liquid debt instruments purchased with a maturity of three months or less to be cash equivalents.

Inventories

Inventories are stated at the lower of cost or market. The LIFO (last-in, first-out) method is utilized to determine cost for a substantial portion of the Company's domestic inventories. All other inventories are determined principally based on average cost.

Depreciation and Capitalized Interest

Depreciation is computed principally on the straight-line method based on the estimated economic lives of the assets. Certain interest charges are capitalized as part of the cost of property, plant and equipment.

Foreign Exchange Contracts

The Company enters into a variety of foreign exchange instruments in order to hedge a portion of both its borrowings denominated in foreign currency and its purchase commitments related to the operations of foreign affiliates.

Gains and losses on such instruments are deferred and amortization is included in the measurement of the foreign currency transactions hedged. Forward contract agreements entered into from time to time require the Company and the counterparty to exchange fixed amounts of U.S. dollars for fixed amounts of foreign currency on specified dates. The value of such contracts will vary with changes in the market exchange rates.

Translation of Foreign Currency Amounts

For non-U.S. subsidiaries which operate in a local currency environment, assets and liabilities are translated to U.S. dollars at year-end exchange rates. Translation adjustments are accumulated in a separate component of stockholders' equity, "Cumulative translation adjustment." Income and expense items are translated at average rates of exchange during the year.

For non-U.S. subsidiaries which operate in a highly inflationary environment, inventories, fixed assets and investments are translated at historical rates as of the dates of acquisition, while other assets and liabilities are translated at year-end exchange rates. Inventories charged to cost of sales and depreciation expense are remeasured at historical rates, while all other income and expense items are translated at average rates of exchange during the year. Gains and losses resulting from translation are included in other income (expense), net.

Excess of Cost Over Net Assets of Businesses Acquired

Excess of cost over net assets of businesses acquired is amortized on the straight-line method over a period of approximately 40 years.

Research and Development

Research and development expenses are charged to operations as incurred and amounted to \$17.8 million for the year 1991, \$16.3 million for the year 1990, \$9.5 million for the nine months ended December 31, 1989, and, for the Predecessor Company, \$3.6 million for the first quarter ended April 2, 1989.

NOTE

4

PRO FORMA FINANCIAL INFORMATION

Presented below are condensed statements of operations for the years 1991 and 1990 on a historical basis and an unaudited pro forma statement of operations for the year 1989, prepared as if the Acquisition (discussed in Note 1) had occurred on January 1, 1989. The pro forma statement reflects adjustments for expenses attributable to the Acquisition, including interest expense arising from Acquisition debt, goodwill amortization and depreciation related to the writeup of plant and equipment to estimated fair value. The pro forma statement also reflects the elimination of historical Federal and state income taxes.

(Millions)	Historical Year Ended December 31,		Pro Forma Year Ended December 31,
	1991	1990	1989
Net sales	\$525.8	\$511.7	\$469.6
Costs and expenses	371.2	364.6	340.3
Goodwill amortization	14.1	14.0	13.4
Operating income	140.5	133.1	115.9
Interest expense	(52.7)	(85.2)	(93.6)
Other income (expense), net	(8.8)	(2.6)	0.6
Income before income taxes	79.0	45.3	22.9
Income taxes	(28.1)	(14.5)	(13.3)
Net income	\$ 50.9	\$ 30.8	\$ 9.6

Pro forma interest expense for the year 1989 was calculated assuming that debt incurred in connection with the Acquisition was outstanding as of January 1, 1989, and that such debt had borne interest at the rates that would have been in effect during 1989. Such debt consisted of a \$499 million bank term loan, a revolving credit facility with an average of \$90 million outstanding, and \$48 million of 16% Senior Increasing Rate Notes. Pro forma interest expense for 1989 does not give retroactive effect to the repayment of term debt with the proceeds of the sale of common stock in July 1991.

Federal and state income taxes were not provided on a pro forma basis in 1989 because the aforementioned interest deduction attributable to the Acquisition debt eliminated the need for a Federal or state tax provision. However, the foreign tax expense for 1989 has remained unchanged from the historical financial statements.

On April 10, 1989, the Company acquired Sutton Laboratories, Inc. ("Sutton") for \$32 million. The acquisition was accounted for as a purchase. Accordingly, the results of Sutton have been included from the date of acquisition in both the Consolidated Statement of Income for the nine months ended December 31, 1989 and the pro forma statement of operations for the year 1989.

NOTE

5

INCOME TAXES

Income tax provision consists of the following:

(Thousands)	Company		Predecessor Company	
	Year Ended December 31, 1991	1990	Nine Months Ended December 31, 1989	First Quarter Ended April 2, 1989
Federal—				
Current	\$(14,225)	\$ 5,090	\$ 6,501	\$ (4,724)
Deferred	(5,532)	(5,090)	(8,083)	(1,741)
Total Federal	(19,757)	—	(1,582)	(6,465)
Foreign	(7,440)	(14,455)	(9,239)	(4,082)
State and local	(916)	(100)	—	(449)
Income tax provision	\$(28,113)	\$(14,555)	\$(10,821)	\$(10,996)

The differences between the income tax provision computed by applying the statutory Federal income tax rate to pretax income and the actual tax provision are as follows:

(Thousands)	Company		Predecessor Company	
	Year Ended December 31, 1991	1990	Nine Months Ended December 31, 1989	First Quarter Ended April 2, 1989
Statutory provision	\$(26,849)	\$(15,410)	\$ (7,878)	\$ (9,943)
Impact of foreign operations	3,933	5,362	233	(678)
Goodwill amortiza- tion	(4,783)	(4,759)	(3,462)	—
Additional depreciation expense resulting from the Acquisition	(1,707)	(1,707)	(1,280)	—
Percentage depletion	1,947	2,078	1,692	348
Other, net	(654)	(119)	(126)	(723)
Income tax provision	\$(28,113)	\$(14,555)	\$(10,821)	\$(10,996)

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The tax effect of timing differences relates to transactions recorded for financial reporting purposes in a period different from that in which such transactions are reported for income tax purposes. The nature of these differences and the tax effect of each were as follows:

(Thousands)	Company			Predecessor Company
	Year Ended December 31, 1991	1990	Nine Months Ended December 31, 1989	First Quarter Ended April 2, 1989
Tax depreciation over book depreciation	\$ (2,235)	\$ (5,105)	\$ (3,292)	\$ (1,991)
Foreign exchange losses (deductible) not deductible for tax purposes	(613)	413	—	—
(Deductible) non-deductible adjustment for inventory valuation reserves	339	479	(1,818)	465
Provisions charged against book income, net	(2,822)	(1,005)	(2,853)	617
Other, net	(201)	128	(120)	(832)
Tax effect of timing differences	\$ (5,532)	\$ (5,090)	\$ (8,083)	\$ (1,741)

Prior to adoption of the Tax Sharing Agreement discussed below, the tax provision was calculated on a separate company basis. The accompanying financial statements do not give retroactive effect to the Tax Sharing Agreement prior to January 1, 1991. The Company has recorded a deferred tax liability which represents the amount of income taxes payable to GAF with respect to income already recorded in the financial statements but which will not become taxable until a future year.

The Company and each of its domestic subsidiaries have entered into an agreement ("Tax Sharing Agreement") with GAF and G Industries with respect to the payment of Federal income taxes and certain related matters. During the term of the Tax Sharing Agreement, the Company is obligated to pay to G Industries an amount equal to those Federal income taxes the Company would have incurred if, subject to certain exceptions, the Company (on behalf of itself and its domestic subsidiaries) filed its own separate Federal income tax return. These exceptions include, among others, that the Company may utilize certain favorable tax attributes—i.e., losses, deductions and credits (except for a limited amount of foreign tax credits and, in general, net operating losses), only at the time such attributes reduce the Federal income tax liability of the GAF group; and that the Company may carry back or carry forward its favorable

tax attributes only after taking into account current tax attributes of the GAF group. In general, subject to the foregoing limitations, unused tax attributes will carry forward for use in reducing amounts payable by the Company to G Industries in future years. Subject to certain exceptions, actual payment for such attributes will be made by G Industries to the Company only when GAF receives an actual refund of tax from the Internal Revenue Service or, under certain circumstances, when GAF no longer owns more than 50% of the Company. Foreign tax credits not utilized will be refunded by G Industries to the Company, if such credits expire unutilized, upon the termination of the statute of limitations for the year of expiration.

The provisions of the Tax Sharing Agreement could result in the Company having greater liability thereunder than it would have had if it (and its domestic subsidiaries) had filed its own separate Federal income tax return. Moreover, under the Tax Sharing Agreement, the Company and each of its domestic subsidiaries are responsible for any taxes that would be payable by reason of any adjustment to the tax returns of GAF or its subsidiaries for prior years relating to the business or assets of the Company or any of its domestic subsidiaries; in addition, the other subsidiaries of the Company are responsible for their respective taxes. The Tax Sharing Agreement provides for analogous principles to be applied to any consolidated, combined or unitary state or local income taxes. Under the Tax Sharing Agreement, GAF makes all decisions with respect to all matters relating to taxes of the GAF consolidated group.

The Company and each of its domestic subsidiaries join in the filing of a consolidated Federal income tax return with GAF. As members of the GAF consolidated group, the Company and each of its domestic subsidiaries are jointly and severally liable for all Federal income tax liabilities of every member of the GAF consolidated group, including tax liabilities not related to the business or assets of the Company and its domestic subsidiaries.

Income taxes payable at December 31, 1991 include \$1.4 million payable to the Company's parent.

In February 1992, the Financial Accounting Standards Board issued Statement No. 109, "Accounting for Income Taxes", which established financial accounting and reporting standards for the effects of income taxes. The new standard is effective no later than for the year 1993. At the date the Company adopts the new accounting rules, it may record the entire catch-up effect in that year or it may retroactively restate prior financial statements, including the financial statements presented herein. The Company does not anticipate that the implementation of this new standard will have a material adverse effect on its financial position or results of operations.

NOTE

6

INVENTORIES

A substantial portion of domestic inventories is valued using the LIFO method. As a result of the Acquisition, there is no material difference between inventories valued at LIFO and average cost.

Inventories consist of the following:

(Thousands)	December 31,	
	1991	1990
Finished goods	\$58,995	\$52,202
Work in process	18,196	14,535
Raw materials and supplies	16,645	16,979
Inventories	\$93,836	\$83,716

NOTE

7

PROPERTY, PLANT AND EQUIPMENT

Property, Plant and Equipment consists of the following:

(Thousands)	December 31,	
	1991	1990
Land and land improvements	\$ 40,414	\$ 39,908
Buildings and building equipment	54,959	52,679
Machinery and equipment	263,784	239,623
Construction in progress	26,054	20,102
Total	385,211	352,312
Less accumulated depreciation	(46,474)	(28,275)
Property, Plant and Equipment, net	\$338,737	\$324,037

NOTE

8

LONG-TERM DEBT

Long-term debt consists of the following:

(Thousands)	December 31,	
	1991	1990
Intercompany Term Note	\$300,995	\$600,000
Borrowings under Intercompany		
Revolving Note	70,000	62,225
Industrial revenue bonds	3,551	4,001
Obligations on mortgaged properties	44,519	44,455
10 ³ / ₈ % Senior Subordinated Notes due 1994	13,684	13,684
11 ³ / ₈ % Senior Subordinated Notes due 1995	6,745	6,745
Unamortized discount	(90)	(116)
Total long-term debt	439,404	730,994
Less current maturities	(25,658)	(32,950)
Long-term debt less current maturities	\$413,746	\$698,044

See Note 17 for information in connection with the issuance of new debt and an amendment to the Credit Agreement discussed below, in March 1992.

The Company has entered into an Intercompany Credit Agreement with G Industries, pursuant to which the Company has the right to obtain loans and the issuance of letters of credit under the Credit Agreement dated as of September 17, 1990, as amended ("Credit Agreement"), between G Industries and the financial institutions party thereto (the "Banks") which makes available to G Industries a five-year \$200 million combined revolving loan and letter of credit facility (subject to reduction by up to \$50 million in January 1994). Pursuant to the Intercompany Credit Agreement, G Industries makes borrowings of revolving loans and obtains the issuance of letters of credit at the request of the Company. The proceeds of such borrowings are loaned by G Industries to the Company pursuant to an intercompany note (the "Intercompany Revolving Note") that mirrors the terms of the revolving credit facility under the Credit Agreement.

In addition, the Company is obligated pursuant to an intercompany note to G Industries for a term loan (the "Intercompany Term Note") under the Credit Agreement, of which \$301 million is outstanding as of December 31, 1991 (see Note 2).

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The Intercompany Credit Agreement permits G Industries to incur "Affiliate Obligations" by obtaining the issuance of up to \$50 million of letters of credit under the Credit Agreement for the benefit of certain subsidiaries of G Industries other than the Company and its subsidiaries (the "Non-ISP Letters of Credit") and by obtaining revolving loans under the Credit Agreement to pay reimbursement obligations arising in connection with drawings on Non-ISP Letters of Credit (the "Non-ISP Revolving Loans").

The Company and certain of its subsidiaries have guaranteed, on a joint and several basis, the assets of the Company and its domestic subsidiaries, and 65% of the capital stock of its foreign subsidiaries are pledged to the Banks to secure all of the obligations of G Industries under the Credit Agreement. The stock of the Company owned by GCC has also been pledged to secure all of G Industries' obligations under the Credit Agreement.

A default by G Industries in respect of any Affiliate Obligations, or by G Industries or affiliates of the Company with respect to covenants under the Credit Agreement or the guarantees, could result in the obligations under the Credit Agreement being accelerated. In addition, the Credit Agreement provides for a cross-default in the event of a default under certain debentures issued by G-I Holdings. In the event G Industries or any other party to the Credit Agreement fails to perform its obligations under the Credit Agreement, the Banks could require the Company and its subsidiaries to perform such obligations pursuant to the terms of their respective guarantees. In such event, the Banks could foreclose upon or sell the assets of the Company and its subsidiaries pledged as collateral (other than to recover amounts outstanding under the Affiliate Obligations). The Banks could also foreclose on the common stock pledged by GCC as collateral, in which event voting control of the Company and its subsidiaries could shift from GAF to the Banks or any party to which the Banks may subsequently transfer their interests in such stock.

In addition, under the Intercompany Credit Agreement, the Company may lend up to \$50 million to G Industries and its subsidiaries. The Company has entered into an agreement with such subsidiaries pursuant to which it makes loans, which loans are payable upon demand and bear interest at market rates. The loans are evidenced by intercompany promissory notes that are pledged to secure the obligations of G Industries under the Credit Agreement.

The Intercompany Term Note matures on September 17, 1998 and the intercompany revolving notes are due and payable on September 17, 1995. Borrowings under the Intercompany Credit Agreement bear interest at a rate (8% on December 31, 1991) based on the Banks' base rate (as defined) or a Eurodollar rate (as defined), at the option of the Company.

A covenant in the Credit Agreement provides that the

Company may not pay dividends (i) that exceed 10% of the Company's consolidated net income or (ii) upon the occurrence and during the continuance of an event of default under the Credit Agreement.

The Company is contingently liable under letters of credit issued on its behalf under the Intercompany Credit Agreement aggregating \$19.5 million as of December 31, 1991.

As of December 31, 1991, after giving effect to \$61.7 million of letters of credit outstanding at G Industries, and to outstanding borrowings, the amount remaining available under the Intercompany Revolving Note was \$68.3 million.

In connection with the Acquisition, the Predecessor Parent Company conducted tender offers for its 11³/₈% Senior Subordinated Notes due 1995 and 10³/₈% Senior Subordinated Notes due 1994, and accepted for payment all validly tendered securities constituting approximately 95% and 91%, respectively, of each issue.

The aggregate maturities of long-term debt as of December 31, 1991 for the next five years are as follows:

(Thousands)	
1992	\$ 25,658
1993	22,456
1994	42,068
1995	108,435
1996	4,955

In the above table, 1995 maturities include the \$70 million of borrowings outstanding under the Intercompany Revolving Note as of December 31, 1991.

NOTE

9

BENEFIT PLANS

Eligible, full-time employees of the Company are covered by one or more of GAF's various benefit plans, including the GAF Capital Accumulation Plan for Salaried Employees, the Retirement Plan for Hourly Employees, and a nonqualified retirement plan for the benefit of certain key employees.

Defined Contribution Plan

The GAF Capital Accumulation Plan is a defined contribution plan for eligible salaried employees. The Company contributes 3% of participants' compensation, plus matching contributions up to an additional 4% of compensation for participants who make voluntary contributions. Each participant is fully vested at all times in the balance of his account. The aggregate contributions made by the Company to the plan and charged to operations were \$2,832,000 for the year 1991, \$2,770,000 for the year 1990, and \$2,077,000 for the nine months ended December 31, 1989, and, by the Predecessor Company, \$795,000 for the first quarter ended April 2, 1989.

Defined Benefit Plans

The Company participates in GAF's Retirement Plan for Hourly Employees (the "GAF Retirement Plan"), which is a noncontributory defined benefit plan. Benefits under this plan are based on stated amounts for each year of service. GAF's funding policy is consistent with the minimum funding requirements of ERISA, plus any additional amounts which GAF may determine to be appropriate.

Because the Company participates in the GAF Retirement Plan, data presented below is for such plan as a whole.

GAF's net periodic pension cost for the GAF Retirement Plan included the following components:

(Thousands)	GAF		Predecessor Parent Company	
	Year Ended December 31, 1991	Year Ended December 31, 1990	Nine Months Ended December 31, 1989	First Quarter Ended April 2, 1989
Service cost	\$ 891	\$ 884	\$561	\$187
Interest cost	1,194	980	585	195
Actual return on plan assets	(649)	(530)	(256)	(85)
Net deferral and amortization	103	150	91	30
Net periodic pension cost	\$1,539	\$1,484	\$981	\$327

Pension expense charged to operations by the Company with respect to its participation in the GAF Retirement Plan was \$1,035,000 for the year 1991, \$811,000 for the year 1990, and \$522,000 for the nine months ended December 31, 1989, and, by the Predecessor Company, \$174,000 for the first quarter ended April 2, 1989.

The following table sets forth the funded status of the GAF Retirement Plan:

(Thousands)	December 31,	
	1991	1990
Accumulated benefit obligation:		
Vested	\$13,080	\$10,319
Nonvested	2,620	2,721
Total accumulated benefit obligation	\$15,700	\$13,040
Projected benefit obligation	\$15,700	\$13,040
Fair value of plan assets, primarily listed stocks and U.S. Government securities	(9,204)	(6,719)
GAF's projected benefit obligation in excess of plan assets	6,496	6,321
Unrecognized prior service cost	(1,736)	(1,657)
Unrecognized net gain (loss)	(259)	(307)
GAF's unfunded accrued pension cost	\$ 4,501	\$ 4,357
The Company's portion of GAF's projected benefit obligation in excess of plan assets	\$ 3,667	\$ 2,392

The difference of \$2 million between the projected benefit obligation in excess of plan assets and the unfunded accrued pension cost as of December 31, 1991 has been recorded by GAF as an unfunded liability. Of that amount, \$1,145,000 has been recorded by the Company as a liability, offset by an intangible asset of \$977,000 and a reduction of stockholders' equity of \$168,000.

In determining the projected benefit obligation, the weighted average assumed discount rate was 8.75% and 9.25% for 1991 and 1990, respectively. The expected long-term rate of return on assets used in determining net periodic pension cost was 9% and 8% for 1991 and 1990, respectively.

GAF has a nonqualified defined benefit retirement plan for the benefit of certain key employees, including certain employees of the Company. Expense accrued by the Company for future obligations under this plan was \$442,000 for the year 1991, \$367,000 for the year 1990, and \$329,000 for the nine months ended December 31, 1989, and, by the Predecessor Company, \$61,000 for the first quarter ended April 2, 1989. Employees who participate in this plan are not entitled to have employer contributions made to their account under the GAF Capital Accumulation Plan.

Other Benefit Plans

GAF maintained an Equity Appreciation Plan, which was terminated upon completion of the initial public offering. As a result, the Company's 1991 results reflect a one-time charge of \$3.8 million, representing the Company's portion of the costs in connection with the plan termination.

In addition to providing pension benefits, GAF presently provides certain health care and life insurance benefits for retired employees. Substantially all of the Company's employees may become eligible for those benefits if they reach normal retirement age while working for the Company. The cost to the Company of retiree health care and life insurance benefits for the year 1991, the year 1990, and the nine months ended December 31, 1989 approximated \$1.9 million, \$2.6 million and \$1.5 million, respectively, and, to the Predecessor Company, \$.6 million for the first quarter ended April 2, 1989.

In December 1990, the Financial Accounting Standards Board issued Statement of Financial Accounting Standards No. 106, "Employers' Accounting for Postretirement Benefits Other Than Pensions." The new standard requires that the expected costs of these benefits be recognized in the financial statements over an employee's active working career. The Company presently recognizes this expense as claims are

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

incurred. Adoption of the new standard is required no later than for the year 1993.

Adoption of the new standard will create a previously unrecognized obligation covering prior years with respect to both existing retirees and active employees. This obligation may be recognized in future financial statements in one of two ways: (1) by immediate recognition through a cumulative catch-up adjustment in the statement of income, based on the discounted present value of expected future benefits attributable to service rendered prior to adoption of the new standard, or (2) prospectively, by amortizing the obligation on a straight-line basis over the average remaining service period of active plan participants.

GAF's actuaries have made a preliminary review of the potential effects of the new accounting standard, using 1991 data. Their estimates are subject to change based on a number of factors, including changes in the assumed health care cost trend rate used in the calculations. Based on such review, GAF's postretirement benefit obligation at December 31, 1991, measured in accordance with the new standard, would be approximately \$82 million, of which GAF has already provided approximately \$9.3 million. If the new standard had been adopted prospectively in 1991, the actuaries estimate that GAF's pretax postretirement benefit expense provision for 1991 would have been approximately \$12 million. GAF's pretax expense provision for 1991 was approximately \$3.6 million, of which approximately \$1.9 million was charged to the Company. The new accounting method will have no effect on the Company's cash outlays for retiree benefits.

NOTE

10

STOCK OPTION PLAN

The 1991 Incentive Plan for Key Employees (the "1991 Incentive Plan") authorizes the grant of options to purchase a maximum of 3,000,000 shares of the Company's common stock. Options may be either options intended to be "incentive stock options" within the meaning of Section 422 of the Internal Revenue Code ("Code") or "nonqualified" stock options for purposes of the Code. The exercise price of options granted must be at least equal to the Fair Market Value (as defined in the 1991 Incentive Plan) of such shares on the date of grant.

During 1991, 836,948 options were granted at an exercise price of \$12.25, all of which were outstanding at December 31, 1991. The term of each option is generally five years and 60 days. Options may not be exercised during the first year after the date of grant. Thereafter, each option becomes exercisable as to 20%, 40%, 60%, 80% and 100% of the shares subject thereto on each of the first through the fifth anniversaries of the date of grant.

Norwithstanding any other provision of the 1991 Incentive Plan, the Compensation and Pension Committee may prohibit the exercise of any or all options to purchase shares of common stock if it pays the option holder an amount equal to the difference between the aggregate Fair Market Value of the shares subject to such options and the aggregate option price. Such amount shall be paid in cash or any combination of cash and common stock at the election of the Compensation and Pension Committee.

NOTE

11

RELATED PARTY TRANSACTIONS

The Company sells mineral products to GAF Building Materials Corporation, a subsidiary of G Industries ("Building Materials"). Such sales by the Company totaled \$30.7 million, \$30.3 million and \$22.4 million for the year 1991, the year 1990, and the nine months ended December 31, 1989, respectively, and, by the Predecessor Company, \$6.6 million for the first quarter ended April 2, 1989. The amount receivable from Building Materials for such sales at December 31, 1990 was \$3.4 million, while there was no receivable from Building Materials for such sales at December 31, 1991.

The Company has provided general management, financial, legal, computer, administrative and facilities services to Building Materials and GAF Broadcasting Company, Inc. ("Broadcasting"). Amounts charged by the Company to Building Materials and Broadcasting for such services were allocated based on the operating income of the Company in each year relative to the operating income of Building Materials and Broadcasting, and represent, in the opinion of management, a fair reflection of the costs of providing such services. Such charges by the Company aggregated \$4.3 million, \$4.5 million and \$2.9 million for the year 1991, the year 1990, and the nine months ended December 31, 1989, respectively, and, by the Predecessor Company, \$.7 million for the first quarter ended April 2, 1989.

The Company has entered into a three-year Management Agreement covering 1991-1993, pursuant to which the Company agreed to provide general management, financial, legal, computer, administrative and facilities services to GAF and its subsidiaries, including Building Materials and Broadcasting for annual management fees of \$4.2 million and \$139,000, respectively. Such fees will increase by 5% per year and can be adjusted in certain limited circumstances, including the occurrence of a substantial change in the scope or nature of Building Materials' or Broadcasting's business. In the event that the Company or its employees provide services to any of its other affiliates substantially greater than

those provided in the past, such affiliate will reimburse the Company for the costs of providing such services.

In addition, the Management Agreement provides that the parties may pay certain of each other's expenses for their mutual administrative convenience until such time as such expenses can be directly billed or charged to the party which

incurred them, so long as each party which incurs such expenses promptly reimburses the party which pays the costs thereof.

Tax Sharing Agreement. See Note 5.

Intercompany Credit Agreement. See Note 8.

NOTE

12

INVESTMENT IN JOINT VENTURE

Financial data presented below pertain to GAF-Hüls Chemie GmbH ("GAF-Hüls"), a joint venture between the Company and Hüls Aktiengesellschaft, which operates a chemical manufacturing plant in Germany. The results of this joint

venture are accounted for by the equity method. The Company's equity in the earnings of GAF-Hüls is reflected as a reduction of cost of products sold in the Company's statements of income.

	Company			Predecessor Company
	Year Ended December 31, 1991	1990	Nine Months Ended December 31, 1989	First Quarter Ended April 2, 1989
(Thousands)				
Income Statement data:				
Revenues: From the Company	\$ 14,895	\$ 22,256	\$ 25,931	\$ 5,983
From others	89,326	99,020	67,155	24,144
Total revenues	104,221	121,276	93,086	30,127
Costs and expenses	78,611	79,440	60,518	18,586
Operating income	\$ 25,610	\$ 41,836	\$ 32,568	\$ 11,541
Net income of GAF-Hüls for the period	\$ 16,621	\$ 19,530	\$ 17,596	\$ 6,232
Equity of the Company in earnings of GAF-Hüls	7,894	9,684	8,698	3,116
Cash Flow data:				
Cash Flows From Operating Activities:				
Net income	\$ 16,621	\$ 19,530	\$ 17,596	\$ 6,232
Depreciation/amortization	4,389	4,977	3,335	994
Working capital changes	3,028	(4,500)	4,947	(18,839)
Other, net	(140)	2,076	3,192	(837)
Total	23,898	22,083	29,070	(12,450)
Cash Flows From Investing Activities:				
Capital expenditures	(576)	(3,385)	(858)	(245)
Cash Flows From Financing Activities:				
Dividends paid	(22,788)	(23,461)	(634)	—
Other, net	(361)	1,876	1,667	(289)
Total	(23,149)	(21,585)	1,033	(289)
Net change in cash and cash equivalents	\$ 173	\$ (2,887)	\$ 29,245	\$(12,984)

(Thousands)	1991	December 31, 1990	1989	April 2, 1989
Balance Sheet data:				
Current assets	\$ 53,611	\$ 57,420	\$ 60,612	\$ 27,734
Noncurrent assets	57,137	61,043	56,997	54,599
Total Assets	\$110,748	\$118,463	\$117,609	\$ 82,333
Current liabilities	\$ 9,879	\$ 33,080	\$ 40,649	\$ 9,771
Noncurrent liabilities	16,357	16,916	15,280	13,755
Total Liabilities	\$ 26,236	\$ 49,996	\$ 55,929	\$ 23,526
Net assets	\$ 84,512	\$ 68,467	\$ 61,680	\$ 58,807
Equity of the Company in net assets of GAF-Hüls	41,588	34,003	30,690	29,352

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE

13

BUSINESS SEGMENT INFORMATION

(Millions)	Company		Predecessor Company
	Year Ended December 31, 1991	Year Ended December 31, 1990	Nine Months Ended December 31, 1989 First Quarter Ended April 2, 1989
Net sales:			
Specialty Derivative Chemicals	\$ 411.4	\$ 396.8	\$ 272.7
Mineral Products	85.4	82.6	60.0
Other	29.0	32.3	22.0
Net sales	\$ 525.8	\$ 511.7	\$ 354.7
Operating income:			
Specialty Derivative Chemicals	\$ 115.5	\$ 108.1	\$ 66.9
Mineral Products	22.7	20.5	17.3
Other	2.3	4.5	5.1
Total operating income	\$ 140.5	\$ 133.1	\$ 89.3
Identifiable assets:			
Specialty Derivative Chemicals	\$ 899.3	\$ 885.9	\$ 871.2
Mineral Products	151.8	156.5	161.9
Other	23.6	22.1	24.7
Total assets	\$1,074.7	\$1,064.5	\$1,057.8
Capital expenditures:			
Specialty Derivative Chemicals	\$ 29.7	\$ 30.1	\$ 16.9
Mineral Products	4.5	4.1	4.2
Other	0.2	1.4	1.8
Total	\$ 34.4	\$ 35.6	\$ 22.9
Depreciation:			
Specialty Derivative Chemicals	\$ 14.9	\$ 14.5	\$ 9.2
Mineral Products	4.4	4.1	2.7
Other	0.4	0.2	0.1
Total	\$ 19.7	\$ 18.8	\$ 12.0

NOTE

14

GEOGRAPHIC INFORMATION

Results set forth below for foreign operations represent sales and operating income of foreign-based subsidiaries.

(Millions)	Company		Predecessor Company
	Year Ended December 31, 1991	Year Ended December 31, 1990	First Quarter Ended April 2, 1989
Net sales:			
Domestic operations*	\$ 278.0	\$ 266.6	\$ 192.2
Europe**	173.9	174.2	115.3
Other foreign operations	73.9	70.9	47.2
Net sales	\$ 525.8	\$ 511.7	\$ 354.7
Operating income:			
Domestic operations	\$ 71.4	\$ 57.0	\$ 45.4
Europe***	55.2	58.3	28.2
Other foreign operations	13.9	17.8	15.7
Operating income	140.5	133.1	89.3
Interest expense and other, net	(61.5)	(87.8)	(66.1)
Income before income taxes	\$ 79.0	\$ 45.3	\$ 23.2
Identifiable assets:			
Domestic operations	\$ 930.4	\$ 928.7	\$ 928.4
Europe***	115.3	108.6	102.1
Other foreign operations	29.0	27.2	27.3
Total	\$1,074.7	\$1,064.5	\$1,057.8

*Net Sales—Domestic Operations exclude sales by the Company's domestic subsidiaries to foreign affiliates of \$107.9 million for the year 1991, \$88.8 million in 1990, \$62.9 million for the nine months ended December 31, 1989, and \$21.7 million for the first quarter ended April 2, 1989.

**Net Sales—Europe exclude sales by the Company's European subsidiaries to domestic and other foreign affiliates of \$13.6 million for the year 1991, \$12.2 million in 1990, \$12.9 million for the nine months ended December 31, 1989, and \$5.3 million for the first quarter ended April 2, 1989.

***Operating Income—Europe, and Identifiable Assets—Europe include the Company's 50% ownership of GAF-Hüls.

NOTE

15

SUPPLEMENTARY INCOME STATEMENT AND
BALANCE SHEET INFORMATION

(Thousands)	Company		Predecessor Company
	Year Ended December 31, 1991	Year Ended December 31, 1990	First Quarter Ended April 2, 1989
Maintenance and repairs	\$34,281	\$30,839	\$22,983
Rental expense—Operating leases	5,291	3,958	2,669

Included in accrued liabilities in the Consolidated Balance Sheets as of December 31, 1991 and December 31, 1990 are approximately \$6.5 million and \$7.5 million, respectively, of accrued environmental remediation costs.

NOTE

16

COMMITMENTS AND CONTINGENCIES

GAF, G-I Holdings, G Industries, and GCC are presently dependent upon the earnings and cash flow of their subsidiaries (including the Company) in order to satisfy obligations as of December 31, 1991 in the amount of \$14.3 million with respect to preferred dividends; \$285.3 million principal amount of debentures on which interest is payable in the form of additional debentures through March 1994, after which interest must be paid in cash, and on which the interest rate was reset to 12.875% in September 1991; and approximately \$137 million of various other liabilities including deferred taxes.

Asbestos Litigation Against GAF. GAF has advised the Company that GAF has been named as a co-defendant in approximately 69,000 pending lawsuits involving alleged health claims relating to the inhalation of asbestos fiber, hav-

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

ing resolved approximately 73,000 other lawsuits involving similar claims. GAF has also advised the Company that GAF has been named as a co-defendant in approximately 37 pending lawsuits alleging economic and property damage or other injuries in schools or public and private buildings caused, in whole or in part, by what is claimed to be the present or future need to remove asbestos material from those premises. GAF has informed the Company that substantially all of the liabilities, including expenses incurred by GAF to date in the asbestos-related lawsuits, have been paid by insurance and that it believes, based upon its financial resources, including insurance, that the continued defense and ultimate disposition of such lawsuits will not have a material adverse effect on GAF's business or financial condition. Neither the Company nor the assets or operations of the Company or GCC, which was operated as a division of GAF prior to July 1986, have been employed in the manufacture or sale of asbestos products. The Company believes that it should have no legal responsibility for damages in connection with asbestos-related claims. Nevertheless, the Company cannot predict whether any such claims will be asserted against it or the outcome of any litigation relating to such claims. In addition, should GAF be unable to satisfy judgments against it in asbestos-related lawsuits, its judgment creditors might seek to enforce their judgments against the assets of GAF, including its indirect holdings of Common Stock of the Company, and such enforcement could result in a change of control of the Company.

Legal Proceedings. The Company has certain liabilities under New Jersey statutes and regulations relating to the closing of its plant in Linden, New Jersey (the "Linden Site"). In June 1989 and June 1990, the Company entered into two Administrative Consent Orders (the "ACOs") with the New Jersey Department of Environmental Protection and Energy ("NJDEPE") under the New Jersey Spill Compensation and Control Act, among other New Jersey laws, which establish deadlines for the Company to (i) comply with surface water discharge standards and (ii) develop a remediation plan for the Linden Site. Pursuant to the latter ACO, the Company posted letters of credit aggregating \$7.5 million to cover the anticipated costs of remediation; however, there can be no assurance as to the actual costs that will be incurred in connection with such remediation.

The Company is a party to a variety of proceedings and lawsuits involving environmental matters, including being named as defendant, respondent or a potentially responsible party, together with other companies, under CERCLA and similar state laws, in which recovery is sought for the cost of

cleanup of contaminated waste disposal sites. These proceedings and lawsuits are, for the most part, in the early stages and, due to the practices of waste disposal haulers and disposal facilities prior to adoption and implementation of the environmental laws and regulations, evidence is difficult to obtain or evaluate.

The Company is seeking dismissal of a number of the lawsuits and proceedings on the ground that there appears to be no substantial evidence of the Company's responsibility for any hazardous waste present at certain of the sites in question. At each site, the Company anticipates, although there can be no assurance, that liability, if any, will eventually be apportioned among the companies found to be responsible for the presence of hazardous waste at the site. Based on facts presently available, it is not possible to predict the eventual cost to the Company in these matters. In the opinion of management, these matters should be resolved gradually over a period of years for amounts that in the aggregate will not be material to the business or financial position of the Company.

The Company has an agreement with its comprehensive general liability insurers to cover, under a reservation of rights, the majority of the Company's liability and expenses in connection with these administrative proceedings and lawsuits. Pursuant to the agreement, the insurers pay costs of the Company in defending these administrative proceedings and lawsuits and reimburse the Company for more than a majority of its liabilities. Each insurer who is a party to this agreement is rated at least "A" by a leading independent insurance rating service, as a result of which the Company believes that the insurers have the ability to make payments pursuant to the agreement, although no assurances can be given. The Company also believes that the amount of insurance available under the policies pursuant to which the expenses and liabilities are being paid will be sufficient to cover the Company's expenses and that portion of the Company's estimated liability agreed to be paid by such insurers. In addition, the Company has established a reserve to cover costs in connection with these administrative proceedings and lawsuits.

The Company has operating leases for transportation, production and data processing equipment and for various buildings. Future minimum lease payments for properties

which were held under long-term noncancelable leases as of December 31, 1991 were as follows:

(Thousands)	
1992	\$2,605
1993	1,844
1994	1,225
1995	787
1996	543
Later years	1,221
Total minimum payments	\$8,225

Based upon information presently available, management believes that the capital expenditures necessary in order to maintain the Company's compliance with environmental laws and regulations will not exceed \$5 million for each of the next five years.

NOTE

17

SUBSEQUENT EVENT

In March 1992, two domestic subsidiaries of the Company (the "Issuers") issued \$200 million of 9% Senior Notes (the "Notes"), due 1999. The Notes are guaranteed by the Company and all of its domestic subsidiaries (the "Subsidiary Guarantors"). The net proceeds from the issuance of the Notes were used by the Company to repay a portion of the Intercompany Term Note to G Industries, and by G Industries to repay a portion of the term loan under the Credit Agreement.

The Notes are general, unsecured obligations of the Issuers. Upon issuance of the Notes, the Credit Agreement was amended, with the Issuers assuming G Industries' obligations under the Credit Agreement, including the term loan and the combined revolving credit/letter of credit facility (except for obligations related to letters of credit issued on behalf of Building Materials, which are limited to \$40 mil-

lion). In addition, all liens on assets of the Company securing the Bank indebtedness were released, with the result that the remaining Bank indebtedness and the Notes rank pari passu.

As a result of the foregoing, the Company's scheduled repayments of long-term debt for the year 1992 have been reduced to \$25.7 million, and the current portion of long-term debt as of December 31, 1991 has been adjusted to reflect such reduction.

Presented below is combined condensed financial information for the Issuers and the Subsidiary Guarantors, which together are interdependent and constitute all of the domestic subsidiaries of the Company. Financial information for the Company's foreign subsidiaries, including its investment in GAF-Hüls, is reflected in the following financial information on the equity basis of accounting.

COMBINED CONDENSED STATEMENTS OF INCOME For the Issuers and the Subsidiary Guarantors

	Company			Predecessor Company
	Year Ended December 31, 1991	December 31, 1990	Nine Months Ended December 31, 1989	First Quarter Ended April 2, 1989
(Millions)				
Net sales	\$385.9	\$355.4	\$255.1	\$ 84.5
Costs and expenses:				
Cost of products sold	233.0	219.9	157.8	58.0
Selling, general and administrative	67.4	64.5	41.7	14.1
Goodwill amortization	14.1	14.0	10.2	—
Total costs and expenses	314.5	298.4	209.7	72.1
Operating income	71.4	57.0	45.4	12.4
Interest expense	(51.2)	(83.1)	(65.1)	(1.9)
Equity in income from foreign subsidiaries and 50% owned joint venture	52.4	61.0	36.9	14.9
Other expense, net	(1.1)	(4.0)	(3.3)	(0.2)
Income before income taxes	71.5	30.9	13.9	25.2
Income taxes	(20.6)	(0.1)	(1.6)	(7.0)
Net income	\$ 50.9	\$ 30.8	\$ 12.3	\$ 18.2

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

COMBINED CONDENSED BALANCE SHEETS
For the Issuers and the Subsidiary Guarantors

(Millions)	December 31,	
	1991	1990
Assets		
Current Assets:		
Cash and cash equivalents	\$ 0.1	\$ 5.0
Accounts receivable, net	28.4	40.0
Inventories	54.8	56.2
Other current assets	10.0	5.6
Receivable from related parties	6.6	3.4
Total Current Assets	99.9	110.2
Property, Plant and Equipment, net	331.1	316.9
Excess of cost over net assets of businesses acquired, net	488.4	502.4
Advances and equity in investment in foreign subsidiaries and 50% owned joint venture	116.0	86.8
Other assets	11.0	6.5
Total Assets	\$1,046.4	\$1,022.8
Liabilities and Stockholders' Equity		
Current Liabilities:		
Short-term debt and current maturities of long-term debt	\$ 0.6	\$ 0.5
Current maturities of Intercompany Term Note	18.7	32.5
Accounts payable	27.2	29.1
Accrued liabilities	32.1	35.8
Income taxes	1.4	—
Total Current Liabilities	80.0	97.9
Long-term debt less current maturities	61.4	61.9
Intercompany Term Note	282.3	567.5
Borrowings under Intercompany Revolving Note	70.0	62.2
Deferred income taxes	39.1	33.5
Other liabilities	29.2	44.8
Stockholders' Equity	484.4	155.0
Total Liabilities and Stockholders' Equity	\$1,046.4	\$1,022.8

COMBINED CONDENSED STATEMENTS OF CASH FLOWS
For the Issuers and the Subsidiary Guarantors

(Millions)	Company			Predecessor Company
	Year Ended December 31, 1991	Year Ended December 31, 1990	Nine Months Ended December 31, 1989	First Quarter Ended April 2, 1989
Cash and cash equivalents, beginning of period	\$ 5.0	\$ 5.0	\$ —	\$ 7.5
Cash Flows from Operating Activities:				
Net income	50.9	30.8	12.3	18.2
Adjustments to reconcile net income to net cash provided by operating activities:				
Depreciation	18.5	17.3	10.9	2.1
Goodwill amortization	14.1	14.0	10.2	—
Deferred income taxes	5.5	5.1	8.1	1.7
(Increase) decrease in working capital	(3.0)	(0.3)	(20.2)	(9.0)
Change in advances and equity in investment in foreign subsidiaries and 50% owned joint venture	(29.2)	(8.0)	(26.4)	5.9
(Increase) decrease in receivable from related parties	(3.2)	3.5	(7.3)	3.9
Other, net	(12.8)	(4.0)	17.4	(0.7)
Net cash provided by operating activities	40.8	58.4	5.0	22.1
Cash Flows from Investing Activities:				
Capital expenditures	(32.7)	(33.7)	(21.8)	(3.8)
Acquisition of Predecessor Company, net of cash acquired	—	—	(585.3)	—
Acquisition of Sutton Laboratories, net of cash acquired	—	—	(32.0)	—
Net cash used in investing activities	(32.7)	(33.7)	(639.1)	(3.8)
Cash Flows from Financing Activities:				
Proceeds from initial public offering	281.3	—	—	—
Proceeds from debt incurred to acquire Predecessor Parent Company	—	—	611.1	—
Increase (decrease) in long-term debt	(291.7)	(5.0)	50.8	—
Change in cumulative translation adjustment	(0.2)	11.6	7.4	(2.9)
Dividends and distributions to GCC	(27.7)	(31.3)	(30.3)	(18.2)
Capital contribution by GCC	25.3	—	—	4.1
Other, net	—	—	0.1	—
Net cash provided by (used in) financing activities	(13.0)	(24.7)	639.1	(17.0)
Net change in cash and cash equivalents	(4.9)	—	5.0	1.3
Cash and cash equivalents, end of period	\$ 0.1	\$ 5.0	\$ 5.0	\$ 8.8

The advances and equity in investment in foreign subsidiaries and 50% owned joint venture and the related equity in income from foreign subsidiaries and 50% owned joint venture include the results of the wholly owned foreign subsidiaries of the Company and its 50% owned joint venture, GAF-Hüls (see Note 12). Profits in inventory on sales to the foreign subsidiaries and the joint venture have been eliminated. Operating income includes \$30.1 million, \$21.7 million and \$14.9 million of profits on sales made to the

foreign subsidiaries and the joint venture for the year 1991, the year 1990 and the nine months ended December 31, 1989, respectively, and, for the Predecessor Company, \$5.5 million for the first quarter ended April 2, 1989.

Dividends received from these entities aggregated \$40.1 million, \$43.0 million and \$14.7 million for the year 1991, the year 1990 and the nine months ended December 31, 1989, respectively, and, for the Predecessor Company, \$9 million for the first quarter ended April 2, 1989.

REPORT OF INDEPENDENT PUBLIC ACCOUNTANTS

To International Specialty Products Inc.:

We have audited the accompanying consolidated balance sheets of International Specialty Products Inc. (a Delaware corporation and a wholly-owned subsidiary of GAF Chemicals Corporation) and subsidiaries as of December 31, 1990 and 1991, and the related consolidated statements of income, stockholders' equity and cash flows for the nine-month period ended December 31, 1989 and the years ended December 31, 1990 and 1991. We have also audited the accompanying consolidated statement of income and cash flows of International Specialty Products Inc. Predecessor Company and subsidiaries for the first quarter ended April 2, 1989. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the

accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of International Specialty Products Inc. and subsidiaries as of December 31, 1990 and 1991, and the results of their operations and their cash flows for the nine-month period ended December 31, 1989 and the years ended December 31, 1990 and 1991, and the results of operations and cash flows of International Specialty Products Inc. Predecessor Company and subsidiaries for the first quarter ended April 2, 1989, in conformity with generally accepted accounting principles.

Arthur Andersen & Co.

Arthur Andersen & Co.
Roseland, New Jersey
March 3, 1992

International Specialty Products Inc.

SUPPLEMENTARY DATA (Unaudited)

QUARTERLY FINANCIAL DATA (Unaudited)

(In millions, except per share amounts)	1991 By Quarter				1990 By Quarter			
	First	Second	Third	Fourth	First	Second	Third	Fourth
Net sales	\$138.7	\$136.2	\$128.5	\$122.4	\$134.2	\$123.3	\$129.2	\$125.0
Cost of products sold	71.2	67.1	63.4	66.6	74.1	60.2	70.2	64.6
Gross profit	\$ 67.5	\$ 69.1	\$ 65.1	\$ 55.8	\$ 60.1	\$ 63.1	\$ 59.0	\$ 60.4
Operating income	\$ 38.8	\$ 40.6	\$ 34.7	\$ 26.4	\$ 33.9	\$ 35.8	\$ 32.7	\$ 30.7
Income before income taxes	\$ 20.3	\$ 22.7	\$ 20.1	\$ 15.9	\$ 13.2	\$ 13.5	\$ 12.3	\$ 6.3
Income taxes	7.4	7.9	7.1	5.7	3.5	3.6	3.5	3.9
Net income	\$ 12.9	\$ 14.8	\$ 13.0	\$ 10.2	\$ 9.7	\$ 9.9	\$ 8.8	\$ 2.4
Earnings per common share*	\$.16	\$.18	\$.13	\$.10	\$.12	\$.12	\$.11	\$.03

*In accordance with the provisions of APB Opinion No. 15, earnings per share are calculated separately for each quarter and the full year. Accordingly, annual earnings per share will not necessarily equal the total of the interim periods. Earnings per common share for each quarter of 1990 and the first and second quarters of 1991 were calculated based

on the 80.5 million common shares outstanding prior to the initial public offering (see Note 2 of Notes to Consolidated Financial Statements), while earnings per common share for the third and fourth quarters of 1991 were calculated based on 99.9 million common shares outstanding after the initial public offering.



International Specialty Products

136 Alps Road
Wayne, New Jersey 07470

Exhibit C

BLANK DIVDER



CN 028
Trenton, N.J. 08625-0028

(609) 633-1408

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT

Michele M. Putnam
Deputy Director
Hazardous Waste Operations

John J. Trela, Ph.D., Director

Lance R. Miller
Deputy Director
Responsible Party Remedial Action

16 JUN 1989

IN THE MATTER OF
GAF CHEMICALS CORPORATION
LINDEN

:
:
:

ADMINISTRATIVE
CONSENT
ORDER

This Order is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "NJDEP" or the "Department") by N.J.S.A. 13:1D-1 et seq. and the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq., and duly delegated to the Assistant Director for Responsible Party Cleanups for the Division of Hazardous Waste Management pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1. The GAF Chemicals Corporation, an indirect wholly owned subsidiary of GAF Corporation, presently owns and operates a chemical manufacturing facility located on South Wood Avenue, Block 587, Lots 1 and 2.1, City of Linden, Union County, New Jersey (hereinafter "the Site"). Hereinafter, the term "GAF" is understood to refer to GAF Chemicals Corporation and its predecessors.

2. Dyestuff and pigment manufacturing began at the Site in 1919. The Site has been continuously utilized as a chemical manufacturing facility from 1919 through to the present. Wastes from the Site operations have been disposed of both on and off site. On-site waste disposal facilities, which are also solid waste management units pursuant to the Resource Conservation and Recovery Act (hereinafter "RCRA") and the Hazardous and Solid Waste Amendments (hereinafter "HSWA"), include, but are not limited to, two landfills that are not currently used, a network of unlined topographical depressions and channels (hereinafter "the ditch system") used to convey waste waters, a waste water treatment facility (hereinafter "WWTF"), and a former indoor storage area for drummed hazardous wastes. GAF asserts that not all of the above listed units are solid waste management units for the purposes of RCRA. GAF currently conducts operations such as chemical manufacturing, warehousing, administration, production, quality control laboratories, maintenance, and technical services in eleven buildings onsite. In addition, there are six inactive buildings at the Site.

3. GAF has advised the Department that Grasselli Chemicals Company began operations in this general area of Linden in 1885, although the

portion of the former Grasselli property, which is now owned by GAF, was not utilized for chemical manufacturing until approximately 1919. It became Grasselli Dyestuff Company and was subsequently incorporated in 1929 as American I.G. Chemical Corporation, which was owned by I.G. Farbenindustrie A.G., a German company. The U.S. company's name was changed in 1939 to General Aniline and Film Corporation. In 1942, 98% of the company stock was seized by the United States Justice Department as a war asset and the facility was operated by the U.S. Government as Alien Property Custodian until 1965, when the U.S. Government sold the stock to the public in a public offering. On April 24, 1968, General Aniline and Film Corporation changed its name to GAF Corporation. In 1986, GAF Chemicals Corporation was incorporated, and all of the assets of the former Chemicals Division of GAF Corporation were transferred to GAF Chemicals Corporation.

4. GAF has advised the Department that the product categories that have been manufactured at the Site include surfactants, dyestuffs, pigments, industrial chemicals, and metal speciality products. The following general categories of compounds were the primary products manufactured by the various operators of the facility during the time frames specified in paragraph number 3:

<u>Production Commenced</u>	<u>Materials Produced</u>	<u>Production Ceased</u>
1919	Dyestuffs	1974
1935	Igepons (Surfactants)	Still in production
1940	Igepals (Surfactants)	Still in production
1941	Carbonyl Iron Powders (Iron Pentacarbonyl)	Late 1940s
1945	Reppe Chemistry Pilot Plant	1957
1955	Caustic Chlorine	1971
1957	Ethylene Oxide	1971
1958	Phosphate Ester Surfactants	Still in production
1962	Agricultural Herbicides, Amino Type Compounds including Amiben	1977
1963	Low Foamers (Surfactants)	Still in production
1964	Polyclar (Polyvinyl pyrrolidone, food grade beer clarifier)	1968
1965	Gantrez Half Esters	1969
1966	Ganex	Still in production
1970	Gafquat 755	Still in production
1975	Propoxylations (Propylene Oxide Surfactants)	Still in production
1976	Tetrahydrofuran	Still in production

Currently, only tetrahydrofuran, surfactants, Gafquat 755 and Ganex are manufactured by GAF at the site.

5. Past chemical manufacturing operations at the Site generated numerous solid and liquid wastes including, but not limited to:

- a. Phenol
- b. Arsenic Wastes including arsenic acid
- c. Mercury Compounds (entrained metallic mercury in dilute sulfuric acid solution, mercuric sulfate)
- d. Chlorinated hydrocarbon compounds from still residues.
- e. Amiben and other amino type agricultural herbicides

GAF states that present manufacturing operations at the site generate phenol wastes, spent caustic, tetrahydrofuran bottoms and waste water from cleaning process equipment.

These substances were disposed of both offsite and onsite. With regard to the onsite disposal, this was accomplished through burial in landfills or through discharge into the ditch system as part of the Site's waste water stream described in paragraphs 9, 10 and 11 below. These substances are pollutants as defined under the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the regulations promulgated pursuant thereto, N.J.A.C. 7:14A-1 et seq. These substances are hazardous wastes and/or hazardous constituents as defined under the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq. and the regulations promulgated pursuant thereto, N.J.A.C. 7:26-1.1 et seq. These substances are hazardous substances as defined under the Spill Compensation and Control Act, 58:10-23.11 et seq. and the regulations promulgated pursuant thereto, N.J.A.C. 7:1E-1.1 et seq.

6. GAF has advised that a 10 to 12 acre landfill, sometimes referred to as the "Old Landfill", is located in the southwest portion of the facility. This landfill was operated from the early 1930s until 1970 by the various owners responsible for the facility during this time period as specified in paragraph 3. In 1981, GAF submitted a Comprehensive Environmental Response, Compensation and Liability Act (hereinafter "CERCLA") Section 103(c) Notification of Hazardous Waste Site document, and on May 22, 1985, GAF submitted a RCRA and HSWA Solid Waste Management Unit Information document, which described the materials disposed in the Old Landfill. GAF advised that GAF and the various other owners deposited dry and liquid chemical wastes (organics, inorganics, solvents, heavy metals, acids), drummed materials, bulk liquids, phenolic oils, laboratory wastes, off specification products, still residues, solid wastes and industrial trash in this landfill. GAF alleges that the "Old Landfill" was operated in accordance with applicable law at the time of its operation.

7. In 1975, GAF discovered a floating organic layer on the ground water beneath the "Old Landfill". GAF installed four concrete standpipes in the "Old Landfill", also in 1975, to recover the organic layer. In 1982, GAF sampled the liquid contents in the standpipes and the analysis of these samples indicated that the liquid layer contained phenols, mercury and chlorinated hydrocarbons.

8. A drum landfill, which is located north of the "Old Landfill", was operated from July 1970 to June 1973. GAF obtained an NJDEP, Solid Waste Administration Registration, Number 20322001, dated July 24, 1970, to operate a landfill at the site. The GAF submittals described in paragraph 6 above indicate that the types of wastes disposed in this landfill included, but were not limited to, those waste types deposited in the "Old Landfill". GAF alleges that the material disposed in the drum landfill was primarily Amiben process waste and Amiben still bottoms.

9. The unlined ditch system, the network of unlined topographic depressions and channels referred to in paragraph 2 above, has served, and continues to serve, to collect and transmit waste water for disposal from the various buildings and chemical process areas throughout the Site. The waste waters include chemical process water, cooling water, and sanitary waste waters. The chemical process waste waters have contained in the past the substances listed in paragraph 5. Waste waters exit some buildings via drain pipes and floor drains directly to crawl spaces beneath the buildings which feed to the unlined ditch system. Some of the buildings have special chemical drains which lead directly to the ditch system, rather than to crawl spaces.

10. The ditch system also captures surface runoff, runoff from surface spills, and leachate seeping from the landfills described in paragraphs 6 and 8 above. Although it was not designed or constructed to contain ground water, GAF alleges that GAF's ground water investigations to date indicate ground water from a large central area of the facility, contained within the uppermost water bearing zone, is captured by the ditch system from which it is conveyed to the WWTF. GAF further alleges that ground water flowing from these areas never reaches the site boundary and does not flow off of the site.

11. Prior to 1977, untreated waste water was conveyed by the unlined ditch system to discharge points into Piles Creek and the Arthur Kill. Immediately prior to the discharge of the waste water into the Arthur Kill, lime was added to the waste water for pH adjustment and the surface of the waste water was skimmed to remove floating oil. During the conveyance of the waste water from the various sources onsite to the treatment and discharge points, the untreated waste water tended to accumulate in low lying areas in and around the ditch system. Since the low lying areas and the ditch system were unlined, infiltration of the waste water occurred. In 1977, GAF constructed the WWTF and, after that date, the ditch system was utilized to convey the waste water to the WWTF for disposal.

12. Due to the fact that the ditch system is unlined, some of the waste water and its contents infiltrate directly into the ground. Accordingly, waste waters containing pollutants, hazardous constituents, and/or hazardous substances, such as those listed in paragraph 5, from manufacturing processes at GAF were discharged into the waters and onto the lands of the State of New Jersey via the unlined ditch system described in paragraphs 9, 10, and 11.

13. GAF manufactured alpha-sulfonated anthraquinones in a building known as Building 49 until 1970. Liquid wastes and waste waters from these manufacturing operations were discharged from Building 49 into chemical

sewers which conveyed them to the ditch system. The building was constructed on pilings over fill that may have consisted of coal ash. During the conveyance of waste water from Building 49 to the treatment and discharge points, the untreated waste water tended to accumulate in low lying areas in and around the ditch system. Since the low lying areas and the ditch system were unlined, infiltration of the waste water occurred. GAF ceased manufacturing operations in Building 49 in 1970 and demolished this building in 1973. The liquid wastes and waste water discharged from Building 49 contained dilute sulfuric acid residues, mercuric sulfate and entrained metallic mercury.

14. Since 1977, GAF has operated the WWTF. The WWTF receives chemical process waste water, contact and noncontact cooling water, cooling tower and boiler blowdowns, equipment washes, sanitary waste water, air pollution control equipment wastewater and storm runoff from the GAF facility. WWTF operations include: coarse screening, oil skimming, equalization, preaeration and neutralization, aeration, clarification, and chlorination, when necessary. The effluent is discharged to the Arthur Kill.

15. GAF filed, pursuant to RCRA, a Part A permit application with the EPA in November 1980 for hazardous waste storage in containers (56,200 gallons capacity) and in an above ground tank (6,000 gallons capacity).

16. On April 5, 1984, the NJDEP, Division of Hazardous Waste Management (hereinafter "DHWM") requested submittal of the RCRA Part B permit application for the storage activities. Subsequent to this submittal, GAF decided to seek reclassification to "generator only" status by reason of its intention to cease storage of containerized hazardous wastes in excess of 90 days, and the exemption of the above ground storage tank from regulation under the hazardous waste program pursuant to N.J.A.C. 7:26-8.2(b).

17. Consistent with its intention to cease on-site storage of hazardous wastes in excess of 90 days, GAF submitted a closure plan for the container storage area in Building Number 53 on December 6, 1985 and submitted a revised partial closure plan on May 5, 1986, which the DHWM approved on July 1, 1986. The closure plan required the removal of all containerized wastes, decontamination of the floor and walls of the first floor, wipe samples of the interior of the first floor after decontamination, and soil sampling beneath and around the building. GAF implemented the partial closure plan. Wipe samples were taken and they indicated that the interior of Building 53 had been decontaminated.

18. Also, on November 17 and 19, 1986, GAF conducted soil sampling around Building Number 53 in accordance with the closure plan described in paragraph 17 above. The sample analysis results indicated contamination of the soil was present. The soil was contaminated with the following hazardous wastes, hazardous constituents, hazardous substances, and /or pollutants: volatile organics, base neutral extractables, cyanide, arsenic and various heavy metals. GAF collected six additional soil samples from beneath Building Number 53 on April 15, 1987, and on April 26, 1988, five other soil samples were collected from an adjacent area where Building Number 52 was formerly located. The analysis of these samples indicated that the soil beneath and adjacent to Building 53 and the soil beneath

Building 52 were contaminated with the following hazardous wastes, hazardous constituents, hazardous substances, and/or pollutants: toluene, total xylenes, various chlorobenzenes, various phthalates, naphthalene, nitrobenzene, and various heavy metals.

19. At a March 18, 1988 meeting between GAF and NJDEP-DHWM, representatives from GAF indicated that the soil contamination under Building Number 53 would be investigated and remediated along with other areas of soil contamination at the Site pursuant to one or more actions being negotiated with the NJDEP, Division of Water Resources. In view of the foregoing, certification of closure of the interior of Building Number 53 (the decontamination and wipe sampling phases of the interior) was submitted in accordance with the NJDEP approved closure plan on April 8, 1988.

20. In order to investigate ground water contamination at the Site, GAF installed seven monitoring wells at the Site between January 11 and January 13, 1983. GAF collected ground water samples from all seven wells on January 25, 1983. The samples were analyzed for 104 priority pollutants. The following materials were detected in the concentrations listed: benzene - 584 parts per billion (hereinafter "ppb"), chlorobenzene - 15,200 ppb, toluene - 96 ppb, phenol - 5,800 ppb, 1,2-dichlorobenzene - 907 ppb, 1,3-dichlorobenzene - 490 ppb, 1,4-dichlorobenzene - 497 ppb, naphthalene - 203 ppb, antimony - 330 ppb, arsenic - 360 ppb, cyanide - 585 ppb, and total phenolics - 13,600 ppb.

21. The following substances have been found in soil and ground water samples taken at this site as described in paragraphs 7, 18 and 20.

- Arsenic
- Benzene
- Chlorobenzene
- Chromium
- Cyanide
- 1,2 Dichlorobenzene
- 1,4 Dichlorobenzene
- Lead
- Mercury
- Naphthalene
- Nitrobenzene
- Phenol
- Polychlorinated Biphenyl (Arochlor 1260)
- Toluene

These substances are pollutants as defined under the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the regulations promulgated pursuant thereto, N.J.A.C. 7:14A-1 et seq. These substances are hazardous wastes and/or hazardous constituents as defined under the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq. and the regulations promulgated pursuant thereto, N.J.A.C. 7:26-1.1 et seq. These substances are hazardous substances as defined under the Spill Compensation and Control Act, 58:10-23.11 et seq. and the regulations promulgated pursuant thereto, N.J.A.C. 7:1E-1.1 et seq.

22. The GAF facility is regulated pursuant to the New Jersey Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., specifically the Hazardous Waste Regulations, N.J.A.C. 7:26-1 et seq. The GAF facility is also regulated pursuant to RCRA and HSWA and is subject to the corrective action requirements contained in Sections 3004(u), 3004(v) and 3008(h) of HSWA. The State of New Jersey currently has similar corrective action authorities and therefore acts as EPA's contractor (through the FY89 RCRA Subtitle C Grant Agreement) to oversee corrective action activities at the GAF facility. In this capacity, all documents submitted pursuant to this ACO may be reviewed by EPA for comments with regard to compliance with HSWA requirements. Such comments will be transmitted to GAF by NJDEP as the lead agency for these activities. It is the intent of the involved parties to satisfy the RCRA/HSWA requirements.

23. Based on these FINDINGS, the Department alleges that GAF has violated the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., specifically N.J.S.A. 58:10A-6, and the regulations promulgated pursuant thereto, N.J.A.C. 7:14A-1 et seq., the Spill Compensation and Control Act, 58:10-23.11 et seq. and regulations promulgated pursuant thereto, N.J.A.C. 7:1E-1.1 et seq., and the Solid Waste Management Act N.J.S.A. 13:1E-1 et seq. and regulations promulgated pursuant thereto, N.J.A.C. 7:26-1.1 et seq. GAF alleges that it has not violated the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., specifically N.J.S.A. 58:10A-6, and the regulations promulgated pursuant thereto, N.J.A.C. 7:14A-1 et seq., the Spill Compensation and Control Act, 58:10-23.11 et seq. and regulations promulgated pursuant thereto, N.J.A.C. 7:1E-1.1 et seq., and the Solid Waste Management Act N.J.S.A. 13:1E-1 et seq. and regulations promulgated pursuant thereto, N.J.A.C. 7:26-1.1 et seq. In order to resolve this matter, the Department and GAF agree to enter into this ACO for the purpose of investigating and remediating all contamination at or emanating from the site.

24. Pursuant to the requirements of HSWA, the list of Solid Waste Management Units identified as continuing release sources at GAF include, but are not limited to: the "Old Landfill", the Drum Landfill, the Unlined Ditch System, and the Building 53 area.

25. To determine the nature and extent of the problem presented by the discharge of pollutants, hazardous wastes, hazardous constituents and hazardous substances both on and off of the site and to develop environmentally sound remedial actions, it is necessary to conduct a remedial investigation and feasibility study of remedial action alternatives (hereinafter "RI/FS"). To correct the problems presented by the discharge, it is necessary to implement a remedial action plan.

26. To resolve this matter without the necessity for litigation, GAF has agreed to conduct an RI/FS and to design and implement a remedial action alternative to remedy any and all pollution at the site, emanating from the site, or which has emanated from the site.

ORDER

NOW THEREFORE IT IS HEREBY ORDERED AND AGREED THAT:

A. Reimbursement of Prior Costs and Damages

27. Within thirty (30) calendar days after the effective date of this Administrative Consent Order, GAF shall submit the amount of \$31,018 to the Department as payment for all costs incurred by the Department to date, in connection with the investigation of, and response to, the matters described in the FINDINGS hereinabove, including the costs associated with the preparation of this Administrative Consent Order. Payment of the above amount shall be made by a cashier's or certified check payable to the "Treasurer, State of New Jersey" or "Administrator, New Jersey Spill Compensation Fund", as appropriate. Payment shall be submitted to the contact listed in paragraph 50. [Section IV., third paragraph]

II. Remedial Investigation and Cleanup

A. Remedial Investigation

28. Within ninety (90) calendar days after the effective date of this Administrative Consent Order, GAF shall submit to the Department a detailed draft Remedial Investigation Work Plan (hereinafter the "RI Work Plan") in accordance with the scope of work set forth in Appendices A, B and C, which are attached hereto and made a part hereof.

29. Within thirty (30) calendar days after receipt of the Department's written comments on the draft RI Work Plan, GAF shall modify the draft RI Work Plan to conform to the Department's comments and shall submit the modified RI Work Plan to the Department. The determination as to whether or not the modified RI Work Plan, as resubmitted, conforms to the Department's comments and is otherwise acceptable to the Department shall be made solely by the Department in writing.

30. Upon receipt of the Department's written final approval of the RI Work Plan, GAF shall conduct the remedial investigation in accordance with the approved RI Work Plan and the schedule therein.

31. GAF shall submit to the Department a draft Remedial Investigation Report (hereinafter "RI Report") in accordance with Appendix A and the RI Work Plan and the schedule therein. GAF and the Department agree that it is their intention to carry out the remedial investigation in the most expeditious fashion possible and the schedule for the performance of the work shall be in conformity with that agreement. Further, GAF and the Department agree that, depending upon the level of site investigation necessitated by the conditions at the Site, the performance of such a remedial investigation and the preparation of a RI Report may be accomplished within 9 to 15 months of the execution of this Administrative Consent Order.

32. If upon review of the draft RI Report the Department determines that additional remedial investigation is required, GAF shall conduct additional remedial investigation as directed by the Department and submit a second draft RI Report.

33. Within thirty (30) calendar days after receipt of the Department's written comments on the draft or second draft (only if

applicable pursuant to the preceding paragraph) RI Report, GAF shall modify the draft or second draft RI Report to conform to the Department's comments and shall submit the modified RI Report to the Department. The determination as to whether or not the modified RI Report, as resubmitted, conforms with the Department's comments and is otherwise acceptable by the Department shall be made solely by the Department in writing.

B. Feasibility Study

34. Within thirty (30) calendar days after receipt of the Department's written final approval of the RI Report, or as otherwise directed by the Department, GAF shall submit to the Department a detailed draft Feasibility Study Work Plan (hereinafter, "FS Work Plan") in accordance with the scope of work set forth in Appendix D, which is attached hereto and made a part hereof.

35. Within thirty (30) calendar days after receipt of the Department's written comments on the draft FS Work Plan, GAF shall modify the draft FS Work Plan to conform to the Department's comments and shall submit the modified FS Work Plan to the Department. The determination as to whether or not the modified FS Work Plan, as resubmitted, conforms to the Department's comments and is otherwise acceptable to the Department shall be made solely by the Department in writing.

36. Upon receipt of the Department's written final approval of the FS Work Plan, GAF shall conduct the feasibility study in accordance with the approved FS Work Plan and the schedule therein.

37. GAF shall submit to the Department a draft Feasibility Study Report (hereinafter "FS Report") in accordance with Appendix D and the approved FS Work Plan and the schedule therein. GAF and the Department agree that the preparation of a draft Feasibility Study Report shall be accomplished within 6 months of the completion of the RI Report.

38. Within thirty (30) calendar days after receipt of the Department's written comments on the draft FS Report, GAF shall modify the draft FS Report to conform to the Department's comments and shall submit the modified FS Report to the Department. The determination as to whether or not the modified FS Report, as resubmitted, conforms to the Department's comments and is otherwise acceptable to the Department shall be made solely by the Department in writing.

C. Remedial Action

39. In the event that the Department determines that remedial action is necessary, the Department will make the selection of the remedial action alternative based on the criteria set forth in Appendix D, Section I.D.

40. Within ninety (90) calendar days after receipt of the Department's written notification of selection of a remedial action alternative, GAF shall submit to the Department a detailed draft Remedial Action Plan in accordance with the scope of work set forth in Appendix E, which is attached hereto and made a part hereof. The ninety (90) day period shall be extended by the Department should the nature of the selected

remedial action alternative, in the judgment of the Department, necessitate a longer period in order to complete the remedial design work. GAF and the Department agree that it is their intention to carry out the remedial action in the most expeditious fashion possible. The detailed draft schedule which is to be prepared by GAF for the performance of the remedial action plan shall reflect this agreement.

41. Within thirty (30) calendar days after receipt of the Department's written comments on the draft Remedial Action Plan, GAF shall modify the draft Remedial Action Plan to conform to the Department's comments and shall submit the modified Remedial Action Plan to the Department. The determination as to whether or not the modified Remedial Action Plan, as resubmitted, conforms to the Department's comments and is otherwise acceptable to the Department shall be made solely by the Department in writing.

42. Upon receipt of the Department's written final approval of the Remedial Action Plan, GAF shall implement the approved Remedial Action Plan in accordance with the schedule therein.

D. Additional Remedial Investigation and Remedial Action

43. If at any time prior to GAF's receipt of written notice from the Department pursuant to paragraph 88 [i.e., the third to last paragraph in the ACO] the Department determines that the criteria set forth in Appendix D (Section I.D.) are not being achieved or that additional remedial investigation and/or remedial action is required to protect human health or the environment, GAF shall conduct such additional activities as directed by the Department.

E. Progress Reports

44. GAF shall submit to the Department quarterly progress reports; the first progress report shall be submitted on or before the 30th calendar day of the month following the first full quarter after the effective date of this Administrative Consent Order. Each progress report thereafter shall be submitted on or before the 30th calendar day of the month following the quarter being reported. Each progress report shall detail the status of GAF's compliance with this Administrative Consent Order and shall include the following:

- a. Identification of site and reference to this Administrative Consent Order;
- b. Identify specific requirements of this Administrative Consent Order (including the corresponding paragraph number or schedule) which were initiated during the reporting period;
- c. Identify specific requirements of this Administrative Consent Order (including the corresponding paragraph number or schedule) which were initiated in a previous reporting period, which are still in progress and which will continue to be carried out during the next reporting period;

- d. Identify specific requirements of this Administrative Consent Order (including the corresponding paragraph number or schedule) which were completed during this reporting period;
- e. Identify specific requirements of this Administrative Consent Order (including the corresponding paragraph numbers or schedule) which should have been completed during the reporting period and were not;
- f. An explanation of any non-compliance with any approved work plan(s), schedule(s) or Remedial Action Plan, and actions taken or to be taken to rectify non-compliance;
- g. Identify the specific requirements of this Administrative Consent Order (including the corresponding paragraph number or schedule) that will be initiated during the upcoming reporting period.

III. Permits

45. GAF shall submit complete applications for and shall timely obtain all necessary Federal, State and local permits for activities which GAF must perform in order to carry out the obligations of this Administrative Consent Order in accordance with the approved time schedules. This Administrative Consent Order shall not be construed to be a permit or in lieu of a permit for existing or former activities which require permits and it shall not relieve GAF from obtaining and complying with all applicable Federal, State and local permits necessary for any future activities which GAF must perform in order to carry out the obligations of this Administrative Consent Order.

46. With regard to permits required to carry out this Administrative Consent Order, within thirty (30) calendar days of receipt of written comments concerning any permit application to a Federal, State or local agency, or sooner if required by the permitting agency, GAF shall modify the permit application to conform to the agency's comments and resubmit the permit application to the agency. The determination as to whether or not the permit application, as resubmitted, conforms with the agency's comments or is otherwise acceptable to the agency shall be made solely by the agency in writing.

47. This Administrative Consent Order shall not preclude the Department from requiring that GAF apply for any permit or permit modification issued by the Department under the authority of the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and/or any other statutory authority for the matters covered herein. The terms and conditions of any such permit or permit modification shall not be preempted by the terms and conditions of this Administrative Consent Order even if the terms and conditions of any such permit or permit modification are more stringent than the terms and conditions of this Administrative Consent Order. GAF reserves the right to contest any and all conditions of a permit or permit modification pursuant to the substantive rights and procedures established in the statutes and regulations which authorize such permits; provided, however, that GAF waives its right to contest the conditions of any such

permit or permit modification to the extent such conditions are substantially consistent with the provisions of this Administrative Consent Order; and provided further that the assertion of any such right shall neither relieve nor delay GAF's obligation to timely comply with the provisions and approved time schedules of this Administrative Consent Order.

IV. Project Coordination

48. GAF shall submit to the Department all documents required by this Administrative Consent Order, including correspondence relating to force majeure issues, by certified mail, return receipt requested or by hand delivery with an acknowledgement of receipt form for the Department's signature. The date that the Department executes the receipt or acknowledgement will be the date the Department uses to determine GAF's compliance with the requirements of this Administrative Consent Order and the applicability of stipulated penalties and any other remedies available to the Department.

49. Within seven (7) calendar days after the effective date of this Administrative Consent Order, GAF shall submit to the Department the name, title, address and telephone number of the individual who shall be the GAF's contact for the Department for all matters concerning this Administrative Consent Order. The individual identified in the following paragraph shall be the Department's contact for the GAF for all matters concerning this Administrative Consent Order.

50. GAF shall submit five (5) copies of all documents required by this Administrative Order, unless otherwise directed by the Department, to:

Melinda Dower, Chief
Bureau of Federal Case Management
NJ Department of Environmental Protection
Division of Hazardous Waste Management
401 East State Street, CN028
Trenton, NJ 08625

51. GAF shall verbally notify the contact person listed above at least 14 days prior to the initiation of any field activities, and GAF shall insure that written confirmation of that notification is received by the Department at least 7 days prior to the initiation of such activities.

V. Financial Requirements

52. GAF shall obtain and deliver to the Department financial assurances in the form of irrevocable letters of credit in the amounts and in the manner set forth herein. GAF shall also establish an irrevocable standby trust fund in the manner set forth herein. GAF hereby agrees that any failure to comply or to timely comply with any of the obligations set forth in this Paragraph 52 shall subject it to the special stipulated penalties herein.

A. IRREVOCABLE LETTERS OF CREDIT

1. Time for and Amount of Letters of Credit: Irrevocable letters of credit totalling SEVEN MILLION FIVE HUNDRED THOUSAND DOLLARS (\$7,500,000.00) shall be established at the times and in the amounts set forth below:

a. Within thirty (30) calendar days after the effective date of this Administrative Consent Order, GAF shall submit to the Department an irrevocable letter of credit in the amount of TWO MILLION DOLLARS (\$2,000,000.00).

b. Within one hundred twenty (120) calendar days after the effective date of this Administrative Consent Order, GAF shall submit to the Department another irrevocable letter of credit in the amount of TWO MILLION FIVE HUNDRED THOUSAND DOLLARS (\$2,500,000.00).

c. On or before March 31, 1990, GAF shall submit to the Department another irrevocable letter of credit in the amount of THREE MILLION DOLLARS (\$3,000,000.00).

2. Form of Letters of Credit: Each of the foregoing irrevocable letters of credit shall meet the following requirements:

a. Each shall be identical to the wording specified in Appendix F, which is attached hereto and made a part hereof;

b. Each shall be issued by a New Jersey State or Federally chartered bank, savings bank, or savings and loan association, which has its principal office in New Jersey, unless otherwise approved by the Department; and

c. Each shall be accompanied by a letter from GAF referring to the Letter of Credit by number, issuing institution and date and providing the following information: the name and address of the facility and/or site which is the subject of the Administrative Consent Order and the amount of funds securing GAF's performance of all its obligations under the Administrative Consent Order.

B. IRREVOCABLE STANDBY TRUST AGREEMENT

1. Time for and Amount of Irrevocable Standby Trust: GAF shall establish an irrevocable standby trust fund within thirty (30) calendar days after the effective date of this Administrative Consent Order, with an initial deposit of ONE THOUSAND DOLLARS (\$1,000.00).

2. Form of Irrevocable Standby Trust: The irrevocable trust fund agreement shall meet the following requirements:

a. Is identical to the wording specified in Appendix G which is attached hereto and made a part hereof;

b. The irrevocable standby trust fund shall be the depository for all funds paid pursuant to a draft by the Department against the letter of credit, provided that the Department may, at its sole option, elect to have funds associated with special stipulated penalties paid directly to the Department;

c. The trustee shall be an entity which has the authority to act as a trustee and whose trust operations are regulated and examined by a Federal or New Jersey agency;

d. Is accompanied by an executed certification of acknowledgment that is identical to the wording specified in Appendix H.

C. SPECIAL STIPULATED PENALTIES & ACCELERATOR CLAUSE

1. Amount of Special Stipulated Penalties: As an exception to Paragraph 59, GAF agrees that it shall pay the special stipulated penalties set forth herein for any failure to comply or to timely comply with any of its obligations as set forth anywhere in this Paragraph 52. Each obligation which is not complied with or which is not timely complied with shall be considered a separate violation and each such violation shall be subject to daily, special stipulated penalties in accordance with the following rate schedule:

<u>Calendar Days After Due Date</u>	<u>Special Stipulated Penalties</u>
1-30	\$25,000 per calendar day
31-over	\$50,000 per calendar day

Special stipulated penalties shall continue to accrue with respect to each violation until such time as GAF shall cure each such failure by GAF to comply with any of its obligations as set forth in this Paragraph 52.

2. Accelerator Clause: Upon the passage of the thirtieth (30th) cumulative day of any failure to comply or to timely comply, whether such cumulative period arises out of one or several violations and whether such cumulative period is continuous or not, all of GAF's obligations pursuant to this Paragraph 52 shall become immediately due including, but not limited to, GAF's obligation to submit to the Department an irrevocable letter of credit in the amount of SEVEN MILLION FIVE HUNDRED THOUSAND DOLLARS (\$7,500,000.00). Any failure to timely comply with this accelerator clause shall also be subject to special stipulated penalties.

3. Time and Terms of Payment: The Department may at any time require the payment of such special stipulated penalties as may have accrued to that date, without regard as to whether GAF may have cured its failure to comply with its obligation(s) by that date. Further, special stipulated penalties shall continue to accrue until such time as the violation is cured.

At the sole discretion of the Department, the Department may either directly withdraw any special stipulated penalties which are due from the letter of credit, or may notify GAF to tender payment of such penalties in the form of a certified check payable to the "Treasurer, State of New Jersey" within twenty-one (21) calendar days. In the latter event, special stipulated penalties shall apply to any failure to tender the certified check within the twenty-one (21) day period.

4. Duty to Supplement Letter of Credit: Should the amount of any of the several letters of credit at any time fall below the applicable

amount specified in Subparagraph A. herein, whether by reason for the Department's withdrawal of special stipulated penalties or otherwise, then GAF shall within ten (10) calendar days of such an eventuality submit to the Department another irrevocable letter of credit which satisfies the applicable amount specified in Subparagraph A and all other requirements of this Paragraph 52 and the Administrative Consent Order.

5. Special Terms: Notwithstanding any other provision in this Administrative Consent Order which may be to the contrary, GAF shall have no right to any notice or any opportunity to cure any failure to timely comply with any obligation other than that which is specifically provided to GAF in this Paragraph 52. Further, it is specifically agreed and understood that GAF's obligations herein are purely financial in nature and that any delay shall not be excusable by reason of the occurrence of any cause which is or may be beyond the control of GAF, except that any delay caused as a result of action or inaction by the Department shall be subject to the normal Force Majeure provisions of this Administrative Consent Order.

6. The provisions of this Subparagraph C shall no longer apply once GAF has posted letters of credit totalling SEVEN MILLION FIVE HUNDRED THOUSAND DOLLARS (\$7,500,000.00) and has paid any special stipulated penalties which have arisen pursuant to this Subparagraph C.

53. GAF shall establish and maintain the standby trust fund until terminated by the written agreement of the Department, the trustee and GAF, or of the trustee and the Department if GAF ceases to exist. GAF shall maintain the letter of credit or performance bond until the Department provides written notification to GAF that the financial assurance is no longer required for compliance with this Administrative Consent Order. In the event that the Department determines that GAF has failed to perform any of its obligations under this Administrative Consent Order, the Department may proceed to have the financial assurance deposited into the standby trust; provided, however, that before the Department draws on the letter of credit or makes a claim against the performance bond, the Department shall notify GAF in writing of the obligation(s) which it has not performed, and GAF shall have a reasonable time, not to exceed thirty (30) calendar days, unless extended in writing by the Department, to perform such obligation(s). In the event the Department draws down on GAF's letter of credit, GAF reserves whatever rights it may have, if any, to challenge the Department's action; provided that GAF agrees that it shall not seek to interfere with nor delay the performance of any work with regard to the Site whether by the Department or by others.

54. At any time, GAF may apply to the Department to substitute other financial assurances in a form, manner and amount acceptable to the Department.

B. Project Cost Review

55. Beginning three hundred sixty-five (365) calendar days after the effective date of this Administrative Consent Order and annually thereafter on that same calendar day, GAF shall submit to the Department a detailed review of all costs required for GAF's compliance with this Administrative Consent Order. This cost review shall include a detailed

summary of all monies spent to date pursuant to this Administrative Consent Order, the estimated cost of all future expenditures required to comply with this Administrative Consent Order (including any operation and maintenance costs), and the reason for any changes from the previous cost review submitted by GAF.

56. At any time after GAF submits the first cost review pursuant to the preceding paragraph, GAF may request the Department's approval to reduce the amount of the financial assurance to reflect the remaining costs of performing its obligations under this Administrative Consent Order. If the Department grants written approval of the request, GAF may amend the amount of the then existing letter of credit or performance bond.

57. If the estimated cost of meeting GAF's obligations in this Administrative Consent Order at any time increases to an amount greater than the financial assurance, GAF shall, within fourteen (14) calendar days after receipt of written notice of the Department's determination, increase the amount of the then existing letter of credit or performance bond so that it is equal to the estimated cost as determined by the Department. GAF shall provide the amended financial assurance to the Department within seven calendar days (7) after it has been obtained.

C. Oversight Cost Reimbursement

58. Within thirty (30) calendar days after receipt from the Department of an itemized accounting of all costs incurred in connection with its oversight functions of this Administrative Consent Order for a fiscal year, or any part thereof, GAF shall submit to the Department a cashier's or certified check payable to the "Treasurer, State of New Jersey" for the full amount of the Department's oversight costs.

D. Stipulated Penalties

59. Upon a demand made by the Department, GAF shall pay stipulated penalties to the Department for its failure to comply with any of the deadlines or schedules required by this Administrative Consent Order including those established and approved by the Department in writing pursuant to this Administrative Consent Order. Each deadline or schedule not complied with shall be considered a separate violation. Payment of stipulated penalties shall be made according to the following schedule, unless the Department has modified the compliance date pursuant to the force majeure provisions hereinbelow:

Calendar Days After Due Date

Stipulated Penalties

1 - 7	\$ 500 per calendar day
8 - 14	\$ 2,000 per calendar day
15 - 21	\$ 3,000 per calendar day
22 - 28	\$ 5,000 per calendar day
29 - over	\$10,000 per calendar day

60. Any such penalty shall be due and payable twenty-one (21) calendar days following receipt of a written demand by the Department. Payment of

stipulated penalties shall be made by a cashier's or certified check payable to the "Treasurer, State of New Jersey".

VI. Force Majeure

61. If any event as specified in the following paragraph occurs which GAF believes will or may cause delay in the compliance with any provision of this Administrative Consent Order, GAF shall notify the Department in writing within seven (7) calendar days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length of the delay, the precise cause or causes of the delay, any measures taken or to be taken to minimize the delay, and the time required to take any such measures to minimize the delay. GAF shall take all necessary action to prevent or minimize any such delay.

62. If the Department finds that: (a) GAF has complied with the notice requirements of the preceding paragraph, (b) GAF has taken all necessary action to prevent or minimize the delay, and; (c) that any delay or anticipated delay has been or will be caused by fire, flood, riot, strike or other circumstances beyond the control of GAF, the Department shall extend the time for performance hereunder for a period no longer than the delay resulting from such circumstances. If the Department determines that either GAF has not complied with the notice requirements of the preceding paragraph, or the event causing the delay is not beyond the control of GAF, failure to comply with the provisions of this Administrative Consent Order shall constitute a breach of the requirements of this Administrative Consent Order. The burden of proving that any delay is caused by circumstances beyond the control of GAF and the length of any such delay attributable to those circumstances shall rest with GAF. Increases in the cost or expenses incurred by GAF in fulfilling the requirements of this Administrative Consent Order shall not be a basis for an extension of time. Delay in an interim requirement shall not automatically justify or excuse delay in the attainment of subsequent requirements. Force Majeure shall not include nonattainment of the goals, standards, guidelines and requirements set forth in the appendices attached hereto.

VII. Reservation of Rights

63. If GAF fails to pay stipulated penalties pursuant to paragraph 60, the Department may institute civil proceedings to collect such penalties or assess civil administrative penalties for the violations of this Administrative Consent Order; the Department may also bring an action in New Jersey Superior Court pursuant to N.J.S.A. 58:10A-10 to enforce the provisions of this Administrative Consent Order.

64. GAF's payment of stipulated penalties pursuant to this Administrative Consent Order shall not preclude the Department from electing to pursue any injunctive relief to enforce the terms of this Administrative Consent Order.

65. The Department reserves the right to unilaterally terminate this Administrative Consent Order in the event that the Department gives GAF notice that GAF has violated a term of this Administrative Consent Order and GAF does not promptly remedy such violation.

66. Nothing in this Administrative Consent Order shall preclude the Department from seeking civil or civil administrative penalties against GAF.

67. This Administrative Consent Order shall not be construed to affect or waive the claims of federal or State natural resource trustees against any party for damages for injury to, destruction of, or loss of natural resources. Further, this Administrative Consent Order shall not be construed to affect or waive any claims, rights or causes of action which the State of New Jersey or the Department may have or acquire against GAF by reason of the assertion of a claim against the State of New Jersey or the Department by a third party.

68. The Department reserves the right to require GAF to take or arrange for the taking of, any and all additional measures should the Department determine that such actions are necessary to protect human health or the environment. Nothing in this Administrative Consent Order shall constitute a waiver of any statutory right of the Department to require GAF to undertake such additional measures should the Department determine that such measures are necessary. GAF's refusal to undertake such additional measures as may be beyond the scope of this Administrative Consent Order shall not be a violation of this Administrative Consent Order.

VIII. General Provisions

69. This Administrative Consent Order shall be binding on GAF, its principals, directors, officers, agents, successors, assignees and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

70. GAF shall perform all work conducted pursuant to this Administrative Consent Order in accordance with prevailing professional standards.

71. In accordance with N.J.S.A. 45:8-45, all plans or specifications involving professional engineering, submitted pursuant to this Administrative Consent Order, shall be submitted affixed with the seal of a professional engineer and any plan involving land surveying submitted pursuant to this Administrative Consent Order shall be submitted affixed with the seal of a land surveyor licensed pursuant to the provisions of N.J.S.A. 45:8-1 et seq.

72. GAF shall conform all actions pursuant to this Administrative Consent Order with all applicable Federal, State, and local laws and regulations. GAF shall be responsible for obtaining all necessary permits, licenses and other authorizations required to comply with this Administrative Consent Order.

73. All appendices referenced in this Administrative Consent Order, as well as all reports, work plans and documents required under the terms of this Administrative Consent Order are, upon approval by the Department, incorporated into this Administrative Consent Order by reference and made a part hereof.

74. Each field activity to be conducted pursuant to this Administrative Consent Order shall be coordinated by an onsite professional(s) with experience relative to the particular activity being conducted at the site each day, such as experience in the area of hydrogeology, geology, environmental controls, risk analysis, health and safety or soils.

75. Upon the receipt of a written request from the Department, GAF shall submit to the Department all data and information concerning pollution at and/or emanating from the site, or which has emanated from the site, including raw sampling and monitor data, whether or not such data and information was developed pursuant to this Administrative Consent Order.

76. GAF shall make available to the Department all technical records and contractual documents maintained or created by GAF or its agents in connection with this Administrative Consent Order.

77. GAF shall preserve, during the pendency of this Administrative Consent Order and for a minimum of six (6) years after its termination, all data, records and documents in their possession or in the possession of their divisions, employees, agents, accountants, contractors, or attorneys which relate in any way to the implementation of work under this Administrative Consent Order, despite any document retention policy to the contrary. After this six year period, GAF shall notify the Department within thirty (30) calendar days prior to the destruction of any such documents. If the Department requests in writing that some or all of the documents be preserved for a longer time period, GAF shall comply with that request. Upon receipt of a written request by the Department, the GAF shall submit to the Department all non-privileged records or copies of any such records.

78. No obligations imposed by this Administrative Consent Order (with the exception of paragraph(s) 58 and 59 [i.e., first stipulated penalty number and administrative oversight paragraph] are intended to constitute a debt, claim, penalty or other civil action which should be limited or discharged in a bankruptcy proceeding. All obligations imposed by this Administrative Consent Order shall constitute continuing regulatory obligations imposed pursuant to the police powers of the State of New Jersey intended to protect human health or the environment.

79. In addition to the Department's statutory and regulatory rights to enter and inspect, GAF shall allow the Department and its authorized representatives access to the site at all times for the purpose of monitoring GAF's compliance with this Administrative Consent Order and/or to perform any remedial activities GAF fails to perform as required by this Administrative Consent Order. GAF shall have the right to monitor the activities of the Department and its representatives and GAF agrees that it shall not interfere with such activities. The Department agrees that it shall observe the same personal safety equipment requirements as are applicable to GAF's employees, and GAF agrees to make available to the Department such equipment.

80. GAF shall not construe any informal advice, guidance, suggestions, or comments by the Department, or by persons acting on behalf

of the Department, as relieving GAF of its obligation to obtain written approvals as required herein, unless the Department specifically relieves GAF of such obligations, in writing in accordance with the following paragraph.

81. No modification or waiver of this Administrative Consent Order shall be valid except by written amendment to this Administrative Consent Order duly executed by GAF and the Department.

82. GAF hereby consents to and agrees to comply with this Administrative Consent Order which shall be fully enforceable as an Order in the New Jersey Superior Court upon the filing of a summary action for compliance pursuant to N.J.S.A. 13:1D-1 et seq., the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq. and/or the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq.

83. In the event that the Department determines that a public meeting concerning the cleanup of the site is necessary at any time, GAF shall ensure that the GAF's appropriate representative is prepared, available, and participates in such a meeting upon notification from the Department of the date time and place of such meeting. GAF's representative shall not be required at any such meeting to answer questions on matters which are beyond the scope of this Administrative Consent Order, provided that GAF's representative shall state the reason for its refusal to answer the question at the public meeting.

84. GAF waives its rights to an administrative hearing concerning the entry of this Administrative Consent Order pursuant to N.J.S.A. 52:14B-1 et seq. and N.J.S.A. 58:10A-1 et seq.

85. GAF agrees not to contest the authority or jurisdiction of the Department to issue this Administrative Consent Order; GAF further agrees not to contest the terms or conditions of this Administrative Consent Order, except as to interpretation or application of such terms and conditions in any action brought by the Department to enforce the provisions of this Administrative Consent Order. Provided, however, GAF expressly reserves the right, entirely at its own risk, not to comply with any direction or decision of the Department, and to defend itself in any action brought to enforce such direction or decision which GAF believes is arbitrary, capricious or unreasonable. It is understood that the rights herein are available to GAF only in an enforcement proceeding brought by the Department and not otherwise. In any such enforcement proceedings, GAF shall have the burden of proof to establish that any direction or decision of the Department was arbitrary, capricious or unreasonable.

In the event that the Department prevails in any such enforcement action, GAF shall be liable for any stipulated penalties which accrued during the period of non-compliance. In addition and upon the request of the Department, GAF agrees to implement such measures as may be directed by the Department to accelerate the rate of the work so as to overcome the delay arising out of GAF's refusal to comply with the direction or decision of the Department. Should GAF prevail in any such enforcement proceeding initiated by the Department, the Department agrees to refund any

stipulated penalties paid by GAF for the alleged violation which precipitated the initiation of the enforcement action.

Similarly, in the event that GAF prevails in any proceeding in which it is alleged that the Department acted arbitrarily, capriciously or unreasonably in exercising its right under Paragraph 53 to draw on the letter of credit, the Department agrees to refund, to the account of the letter of credit, the funds so drawn relative to that contested enforcement action. This provision shall not be construed to provide for reimbursement of the account of the letter of credit for monies drawn down for any activity other than that which is the subject of the contested enforcement proceeding in which GAF prevails, nor shall it be construed to require that the Department refund such portion of the funds as may have been expended in a manner that was not arbitrary, capricious or unreasonable.

GAF agrees that it shall not seek to interfere with nor delay the performance of any work with regard to the Site whether by the Department or by others and whether such work is disputed pursuant to this paragraph or not. Should the Department, in the exercise of its sole discretion, request that GAF proceed with any work which is not in dispute pursuant to the terms of this paragraph, GAF agrees that it shall timely comply with any such request.

This paragraph shall not be construed as a limitation upon any other right or remedy that the Department may have in seeking redress for GAF's refusal to comply with any direction or decision of the Department.

86. GAF agrees that this Administrative Consent Order obligates GAF to consent to and to modify its draft and final reports to conform with the Department's comments. GAF may express its disagreement with such comments if it so desires, provided that any such expression shall not be construed to be any limitation, impairment or condition upon GAF's obligations hereunder.

87. It is the mutual intention of GAF and the Department that the investigatory and cleanup requirements of this Administrative Consent Order shall be in conformity with and shall satisfy the applicable requirements of the statutes and regulations which form the basis for this Administrative Consent Order, i.e., the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq.; the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq.; and the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq. Where the requirements conflict, the more stringent requirement shall apply. In no event shall this provision be construed as a limitation, impairment or waiver of the statutory or regulatory rights of the Department including but not limited to those reserved by Paragraph 68 or otherwise.

88. Except with regard to proceedings to enforce this Administrative Consent Order, in entering this Administrative Consent Order, GAF neither admits nor denies the findings made by the Department herein, nor does GAF admit any violations of law or any liability under any of the cited statutory authorities or otherwise.

89. Should the provisions of the Environmental Cleanup Responsibility Act ("ECRA"), N.J.S.A. 13:1K-6 et seq. become applicable to the Site at

any time, GAF shall comply with any and all ECRA requirements, including but not limited to substantive, procedural, administrative and environmental requirements; however it is the mutual intention of GAF and the Department that the investigatory and cleanup requirements of this Administrative Consent Order shall be in conformity with the environmental requirements of ECRA with respect to soil and ground water contamination addressed pursuant to this Administrative Consent Order. Should the environmental requirements of ECRA conflict with any other applicable requirements, the more stringent requirements shall apply. In no event shall this provision be construed as a limitation, impairment or waiver of the statutory or regulatory rights and requirements of the Department pursuant to ECRA.

90. GAF shall provide a copy of this Administrative Consent Order to each contractor retained to perform the work required by this Administrative Consent Order and shall condition all contracts and subcontracts entered for the performance of such work upon compliance with the terms and conditions of this Administrative Consent Order. GAF shall be responsible to the Department for ensuring that their contractors and subcontractors perform the work herein in accordance with this Administrative Consent Order.

91. GAF shall give written notice of this Administrative Consent Order to any successor in interest within 90 calendar days prior to transfer of ownership of GAF's facilities which are the subject of this Administrative Consent Order, and shall simultaneously verify to the Department that such notice has been given. This requirement shall be in addition to any other statutory or regulatory requirements arising from the transfer of ownership of GAF's facilities.

92. The requirements of this Administrative Consent Order shall be deemed satisfied upon the receipt by GAF of written notice from the Department that GAF has demonstrated, to the satisfaction of the Department, that the obligations imposed by this Administrative Consent Order have been completed by GAF.

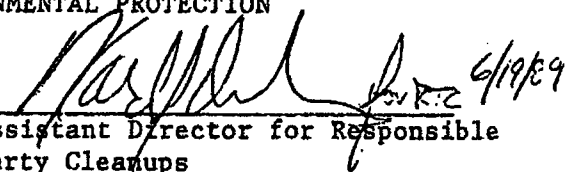
93. GAF shall submit to the Department, along with the executed original Administrative Consent Order, the appropriate documentary evidence (such as a corporate resolution, see Appendix H for an example) that the signatory for GAF has the authority to bind GAF to the terms of this Administrative Consent Order.

94. This Administrative Consent Order shall become effective upon the execution by the Department.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

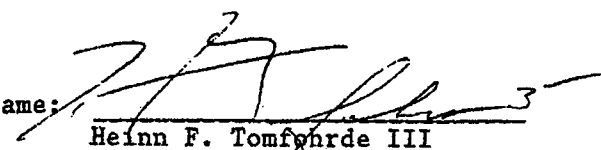
Date: June 16, 1989

By:

 6/19/89
Assistant Director for Responsible
Party Cleanups
Division of Hazardous Waste
Management

By: GAF CHEMICALS CORPORATION

Name:


Heinn F. Tomfeyrde III

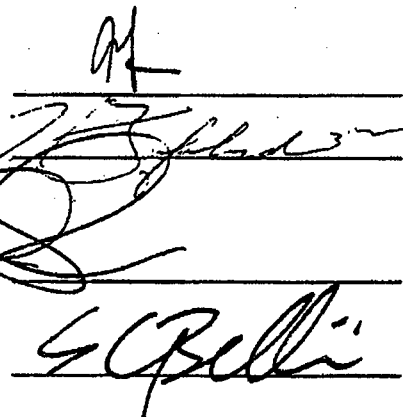
Title: GAF CHEMICALS CORPORATION
President

CERTIFICATE

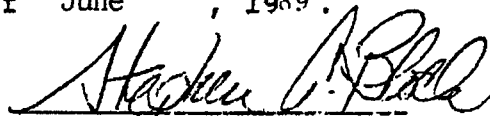
The undersigned, the duly elected and acting Assistant Secretary of GAF Chemicals Corporation, a Delaware corporation, does certify as follows:

Samuel J. Heyman, Heinn F. Tomfohrde, Salvatore C. Bellini and Irving Kagan are duly elected, qualified and acting officers of GAF Chemicals Corporation in the capacities set forth opposite their respective names and the signatures set opposite their respective names are their true and genuine signatures.

Samuel J. Heyman	Chairman
Heinn F. Tomfohrde	President
Irving Kagan	Senior Vice President, General Counsel and Secretary
Salvatore C. Bellini	Vice President and Controller




IN WITNESS WHEREOF, I have hereunto signed my name and affixed the seal of GAF Chemicals Corporation this 16th day of June, 1989.


Stephen A. Block
Assistant Secretary

I, Deborah D. Lawson, Assistant Secretary of GAF Chemicals Corporation, do hereby certify that Stephen A. Block is the duly elected, qualified and acting Assistant Secretary of GAF Chemicals Corporation and that the signature appearing above opposite his name is his genuine signature.

IN WITNESS WHEREOF, I have hereunto signed my name this 16th day of June, 1989.


Deborah D. Lawson

BLANK DIVDER

ECKENFELDER INC.

May 10, 1989

Mr. Anthony ten Braak
GAF Chemicals Corporation
1360 Alps Road
Wayne, NJ 07470

RE: GAF Linden Plant Administrative Consent Order

Dear Tony:

As we discussed, I am hereby providing examples of several advantageous aspects of the GAF Linden site which could be used in negotiations with NJDEP regarding the amount of financial assurance required.

These factors are as follows:

1. The site already possesses a wastewater treatment plant which is presently providing treatment for approximately 70 percent of the groundwater on the site. Consequently, a groundwater-based remedial action plan for the site would not have to include design and construction of a separate groundwater treatment plant.
2. The ^{GAF site} plant lies within a major groundwater discharge area of the Brunswick formation aquifer. As a result, widespread groundwater contamination from the site is all but impossible. Therefore, the cost of aquifer restoration efforts would be lower than at many sites. *otherwise elsewhere*
3. The Brunswick formation aquifer beneath the site and throughout much of the Arthur Kill area contains brackish water. This fact, in combination with the site's location in a major groundwater discharge area, dictates that the site does not pose a risk to groundwater-based water supplies.

There are other minor aspects of the site which could beneficially affect cleanup costs but are probably not worth mentioning. Listing a number of minor positive aspects of the site would likely undermine the importance of the above three items and give the impression that we're "grasping for straws".

Give me a call at the office if you have any questions regarding the above items.

Very truly yours,

ECKENFELDER INC. (formerly AWARE Incorporated)

Robert D. Mutch Jr.

Robert D. Mutch, Jr., P.Hg., P.E.,
Executive Vice President

/cs

1200 MacArthur Boulevard
Mahwah, New Jersey 07430
201.529.0800
FAX 201.529.0818

*6091
633-1455*

BLANK DIVDER

GAF CHEMICALS CORPORATION
1361 Alps Road Wayne NJ 07470-3688

201 628 3000

A Subsidiary of
GAF CORPORATION



RECEIVED

MAY 12 1989

May 12, 1989

A. J. TEN BRAAK

Mr. Neil Jiorle
Case Manager
Div. of Hazardous Waste Management
Dept. of Environmental Protection
401 E. State St., 5th Floor, CN 028
Trenton, NJ 08625-0028

Dear Mr. Jiorle:

As agreed in earlier conversations with Mr. Anthony ten Braak of GAF, I am enclosing a copy of GAF Chemicals Corporation's application to the New Jersey Siting Commission seeking approval of our Linden site for the construction and operation of a high temperature commercial incinerator.

Should you have any questions or need more information, please contact me.

Sincerely,

A handwritten signature in cursive script, reading "Perry J. Russo".
Perry J. Russo
Associate Director -
Engineering
201-628-3504

FJR:mh
Encs.: Books 36/36A

cc: A. ten Braak
File

BLANK DIVDER

KIMMELMAN, WOLFF & SAMSON

A PROFESSIONAL CORPORATION

COUNSELLORS AT LAW
280 CORPORATE CENTER

5 BECKER FARM ROAD
ROSELAND, NEW JERSEY 07068

201-740-0500

TELECOPIER: 201-740-1407

IRWIN I. KIMMELMAN
DAVID SAMSON
JOEL A. WOLFF
THOMAS R. O'BRIEN
RONALD E. WISS
EDWARD S. RADZEL
ARTHUR S. GOLDBERG
ARMEN SHANINIAN
MARTIN L. WIENER
GAGE ANDRETTA
MARK R. LIPTON
DANIEL A. SCHWARTZ
DOUGLAS P. BLACK
DANIEL B. CALDWELL
WILLIAM J. BRENE
KENNETH M. LAYTON
DAVID L. SCHLOSSBERG
PAUL M. COLWELL

GARY M. LACHMAN
DAVID J. REICH
ROBERT S. NIES
DENNIS BROOKIN
DENNIS M. TOFT
N. JAMIE DICKER
MORRIS BIENENFELD
W. JEREMY OSTOW
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THOMAS P. HONANAN, JR.

STEVEN J. BRODMAN
ROBERT T. LAPIDUS
LAURENCE M. SMITH
JONATHAN S. DAVIS
ROHANNA S. HARNETT
DONNA J. HANCE
LAUREN M. O'BULLIVAN
SHIRYL A. WEINGARTEN
LYNN WEINSTEIN
RINA BEDER COHEN
LISA J. KELLY
DEBRA TYURKODY MIRANDI
JOSEPH HONANAN
BRIAN W. MOORE
MICHAEL S. RAPPAPORT
ROBERT L. TENACK

*MEMBER N.J. AND N.Y. BARS
*NEW YORK BAR ONLY

VIA TELECOPY

May 12, 1989

Mr. Neil Jiorle
Case Manager
Division of Hazardous
Waste Management
Department of
Environmental Protection
401 East State Street 5th Floor
CN 028
Trenton, New Jersey 08625-0028

cc: W. Chambers
L. Pasculli

Re: GAF Chemicals Corporation

Dear Mr. Jiorle:

In considering the appropriate amount of financial assurance in the Administrative Consent Order for the remediation of GAF Chemical Corporation's Linden site presently under negotiation, we would like to provide examples of several advantageous aspects of the Linden site which the Department should consider:

1. The site already possesses a wastewater treatment plant which is presently providing treatment for approximately 70 percent of the ground water in the upper saturated zone on the site. Consequently, a ground water remedial action plan for the site would not have to include design and construction of a separate ground water treatment facility.

2. The GAF plant site lies within a major ground water discharge area of the Brunswick formation aquifer. As a result, widespread ground water contamination from the site is all but impossible. Therefore, the cost of aquifer restoration efforts, if any are required, would be lower than at many other sites.

KIMMELMAN, WOLFF & SAMSON

Mr. Neil Jiorle

Page 2

May 12, 1989

3. The Brunswick formation aquifer beneath the site and throughout much of the Arthur Kill area contains brackish water. This fact, in combination with the site's location in a major ground water discharge area, shows that the site does not pose a risk to ground water based water supplies.

As mentioned above, approximately 70 percent of the ground water on the site is captured and treated by the existing wastewater treatment plant. As indicated on figure E-6 of the Application for Site Designation, Site Assessment Report, which was submitted to the Hazardous Waste Facilities Siting Commission, the 30 percent not being captured at present is on the western portion of the property nearest to the New Jersey Turnpike and is far removed from present or past operating or disposal facilities.

In our estimation, removal of contamination point sources will not be required. The reason for this is that the "dump site" is on the highest area of the entire 140 acre site. This "dump" was used primarily for ordinary trash dumping. Secondly, the drum landfill area is not expected to have any drums left suitable for removal. It is, therefore, expected that capture and treatment of ground water is the best and most advantageous manner of remediation.

Our estimated costs, including a provision for operation and maintenance costs to maintain the treatment facility just for ground water treatment, are between \$2.0 and \$3.5 million. The net present value for operating and maintenance is estimated to be \$550,000.

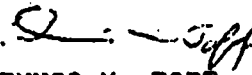
As indicated to you, for present surfactant operations, the installation of a tertiary treatment facility will take place in order to continue to meet the NJPDES-DSW permit bioassay requirements.

KIMMELMAN, WOLFF & SAMSON

Mr. Neil Jiorle
Page 3
May 12, 1989

We will attempt to provide the additional financial information you requested in the next day or two. Please advise if any further information is required. Please also call to confirm our meeting on May 18, 1989 at 10:00 A.M.

Very truly yours,


DENNIS M. TOFT

DMT/jah
cc: Howard Eng, Esq.
Mr. Anthony J. ten Braak

BLANK DIVDER

ECKENFELDER INC.

BUREAU OF
FEDERAL CASE MANAGEMENT

OCT 30 1989

October 26, 1989

6338

Mr. James Bridgewater
New Jersey Department of Environmental Protection
Bureau of Hazardous Waste Engineering
33 Arctic Parkway
CN 028
Trenton, New Jersey 08625

RE: GAF - Linden Site
Proposed Hazardous Waste Incinerator

Dear Mr. Bridgewater:

As discussed at the meeting of October 16, 1989 concerning the above-referenced facility, the purpose of this correspondence is to outline available 100-year flood elevation information for the Arthur Kill and to define elevation data to be used in the design of flood controls.

By way of background, the GAF Linden facility is located along the Arthur Kill, approximately 3.5 miles south of Newark Bay and approximately nine miles north of Raritan Bay. The Arthur Kill is tidal and all of the available flood elevation data are based upon tidal stillwater elevations for the area.

The 100-year flood elevation data for the Arthur Kill in the site vicinity are presented in three Flood Insurance Studies prepared by the Federal Emergency Management Agency, as follows:

- City of Linden, Union County, New Jersey, May 1976.
- City of Elizabeth, Union County, New Jersey, November 1, 1985.
- City of New York, Bronx, Queens, New York, Kings and Richmond Counties, New York, May 16, 1983.

1200 MacArthur Boulevard
Mahwah, New Jersey 07430
201.529.0800
FAX 201.529.0818

NJDEP0000108

Flood elevation data from these studies, for the 100-year event, in the site vicinity may be summarized as follows:

<u>Location</u>	<u>Elevation</u>	<u>Source</u>
At Victory Boulevard approximately one mile south of the site	8.6 feet	City of New York
At Confluence with Elizabeth River, approximately three miles north of the site	8.3 feet	City of Elizabeth
Approximately four miles South of Goethals Bridge, approximately 1.5 miles south of the site	8.6 feet	City of Elizabeth
Reach of Arthur Kill adjacent to City of Linden	11.5 feet	City of Linden

A review of the above data indicates consistency of the data between the Elizabeth and New York studies but a difference from the Linden study. The Linden study, performed in 1976, presented detailed hydrologic and hydraulic analyses for fluvial flooding (i.e. non-tidal). However, actual methods of analyses for tidal flooding along the Arthur Kill are not presented in the study. The study deals with tidal flooding solely through reference to a figure of total tide versus frequency. The source or derivation of the tide data are not provided. In addition, the Linden study references benchmarks and a datum established in 1928 for the City of Linden and it is unclear how this datum may relate to the National Geodetic Vertical Datum of 1929 used in later studies, as discussed below.

By contrast, the study for the City of New York presents a detailed description of methods of analyses for the determination of tidal flood elevations. In particular, this study used mathematical modeling and waterway geometry to generate synthetic storm surges. The modeling was then calibrated and verified against three hurricanes and 13 historical northeasters. Further, observed historical data were used to develop storm surge distributions. Statistical analyses were then applied to define stillwater (tidal) elevations at specific recurrence intervals. The methods of analyses were developed for the New York State Department of Environmental Conservation and were documented in this flood insurance study.

Mr. James Bridgewater

Page 3

October 26, 1989

The City of Elizabeth study (borders Linden to the North) adopted the data generated from the New York City study for the Arthur Kill. No additional analyses were performed. Also, data for the New York City and Elizabeth studies are based upon the National Geodetic Vertical Datum of 1929. There is, therefore, no uncertainty as to the elevation reference for these flood studies and the associated flood data.

Given the above, the more accurate, thoroughly analyzed, and recent 100-year flood elevation data are those embodied in the City of Elizabeth and City of New York studies. GAF plans to use these data in the design of flood controls for the proposed facility. More particularly, for insurance purposes, the flood elevations are rounded and elevation nine feet (NGVD) is that typically referenced out of the above-noted flood insurance studies. GAF plans to use this elevation of nine feet for design.

We would appreciate your review of and concurrence on the above selection of a 100-year flood elevation so that a common basis for design is established. We have attached copies of the three referenced flood insurance studies for your use.

Thank you for your assistance in this matter.

Sincerely,

ECKENFELDER INC.

Scott MacMillan for

Gary J. DiPippo, P.E.
Director, Waste Management

/cp

Attachments

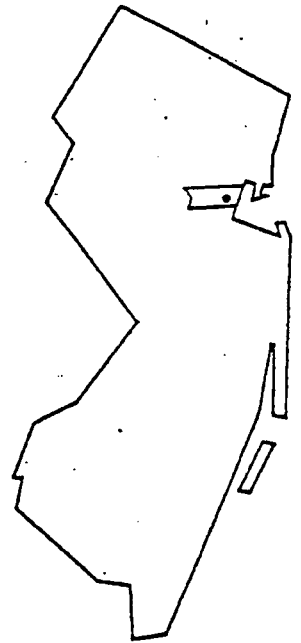
cc: Anthony ten Braak
Perry Russo
Dennis Toft
R. Scott Groshner
Roman Luzacky ✓
Richard Gimello

NJDEP0000110

FLOOD INSURANCE STUDY



CITY OF LINDEN
UNION COUNTY,
NEW JERSEY



MAY 1976

U.S. DEPARTMENT of HOUSING & URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

NJDEP0000111

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Exhibit 4 - Elevation Reference Marks	Panels 07 - 08

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the City of Linden, Union County, New Jersey, and to aid in the administration of the Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of this information will be to convert Linden to the regular program of flood insurance by the Federal Insurance Administration. Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

Coordination for this study included discussions with the City Engineer and members of his staff to discuss this report and any proposed development and drainage plans for the immediate future.

A final coordination meeting with the community was held on June 24, 1975.

1.3 Authorization and Financing

This Flood Insurance Study was conducted by the New York District, U. S. Army Corps of Engineers, at the request of the Federal Insurance Administration, U. S. Department of Housing and Urban Development. The source of authority for the study is the National Flood Insurance Act of 1968, as amended. Authority and financing are contained in Inter Agency Agreement No. IAA-H-19-74, Project Order Nos. 17, 18, and 23.

2.0 AREA STUDIED

2.1 Scope of Study

The City of Linden is located in Union County, New Jersey, about 16 miles southwest of the Battery, New York City. This study is confined to the corporate limits of the City of Linden, New Jersey. Four waterways (Morses Creek, Peach Orchard Brook, West Brook, and Kings Creek) and the Arthur Kill-Rahway River tidal flood plain were studied in detail for this report. These waterways account for all fluvial and tidal flooding within the city. The area of study is shown on the Vicinity Map (Figure 1).

2.2 Community Description

Linden is a suburban industrial community with commercial development. It has an area of eleven square miles, and lies in the Rahway River Basin at the confluence of the Rahway River and the Arthur Kill. The rise in ground elevation is gradual from the marshes in the east along the Arthur Kill to the hills in the west, approaching 80 feet in elevation. In 1971, Linden had a population of 41,409. There were 13,599 dwelling units, of which 7,158 were one-family houses. The 1970 market valuation of these homes is \$172,599,750. The average value of a residence is about \$26,000.

Peach Orchard Brook has a drainage area of 3.47 square miles. Peach Orchard Brook's length from the dam to the upstream limits of its drainage area is 4.0 miles, of which approximately two miles is within the City of Linden. The total fall for Peach Orchard Brook from Chandler Avenue to the reservoir is about 22.8 feet. This is an average of 11.4 feet per mile. The stream flattens out at several places, in particular between Husa Avenue and Essex Avenue and upstream of Pennsylvania Railroad. In its upper reach, Peach Orchard Brook flows for approximately one-half mile through a built-up residential area. Downstream of Linden Avenue Bridge, Peach Orchard Brook flows through old reservoirs whose dams have either deteriorated or have been removed, until it joins West Brook at the Exxon reservoir.

West Brook has a drainage area of 5.9 square miles. The length of West Brook from the reservoir dam to the upstream limits of its drainage area is 7.4 miles, of which two and three-fourths miles are within the City of Linden. From the city limit at St. Georges Avenue to Winans Avenue, or approximately two miles, West Brook has an average channel bottom slope of 11.5 feet per mile, or an average slope of 0.22 percent. In its upper reach, West Brook flows through a heavily built-up residential area. From Winans Avenue to Clinton Avenue, West Brook has been widened to an 80 foot channel with a relatively flat bottom. Below Clinton Avenue, West Brook is flat, emptying through a marshland into the Exxon reservoir where it joins Peach Orchard Brook.

Kings Creek has a drainage area of 1.1 square miles. It originates at a piped storm system discharging just below the Pennsylvania Railroad. Starting at Route 1, the creek flows in a piped storm system; and no channel exists for a distance of approximately 900 feet. When the piped system cannot handle the flow, the waters top

Route 1 and flow in adjacent streets in a varying sheet flow pattern at a depth of about one foot.

Morses Creek begins at the confluence of Peach Orchard Brook and West Brook at the Exxon reservoir, and flows easterly for approximately two miles to its mouth at the Arthur Kill. Its total drainage area is 11.2 square miles. The entire length of Morses Creek runs through the Exxon Oil Refinery. .

2.3 Principal Flood Problems

The city is subject to both tidal and fluvial flooding, although tidal wave velocities are dampened by the meanders of the stream channels. This tidal influence is less severe than the fluvial flooding along these waterways. The city is subject to fluvial flooding along Peach Orchard Brook, West Brook, and Kings Creek.

2.4 Flood Protection Measures

Flood control measures in the study area have consisted of channel improvements and removal of restrictions. West Brook was widened and realigned between Clinton and Winans Avenues and new bridges constructed at these locations, thus lowering fluvial flood elevations in this area and reducing upstream backwater effects. In addition, an extensive piped storm relief system was constructed in the areas to the east of West Brook, providing good interior drainage in the project area, and reducing the frequency of flooding along West Brook. A feasibility study of flood control improvements along Peach Orchard Brook is under preparation by the New York District, U. S. Army Corps of Engineers.

3.0 ENGINEERING METHODS

For streams studied in detail in the City of Linden, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10-, 50-, 100-, and 500-years have been selected as having special significance for the land use and flood insurance applications of the Flood Insurance Program. The analyses reported here reflect current conditions in the watersheds of the streams.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of

the selected recurrence intervals for each stream studied in detail in the city.

Hydrologic analyses for this Flood Insurance Study were prepared by the New York District, U. S. Army Corps of Engineers, using the log-Pearson Type III analysis on the physically similar, gaged Saddle River at Lodi, New Jersey, and transferring this information to the study area via areal comparisons (Reference 9). Discharge-Drainage Area Curves were prepared from this data and are included in this report in Figures 2 and 3. A Total Tide-Frequency Curve was prepared for Arthur Kill and Rahway River, as can be seen in Figure 4.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of streams in the community are carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each stream studied in detail.

Water-surface profiles, reaches, and flooded areas were determined by using the U. S. Army Corps of Engineers computer program HEC-2 "Water-Surface Profiles" in conjunction with field surveys and field inspections by hydraulic engineers (Reference 2). Water-surface profiles are shown on Plates 01P to 05P, Exhibit 1.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary and floodway map designed to assist communities in developing flood plain management measures that will provide the best use of their flood plain lands.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Insurance Administration as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community.

For each stream studied in detail, the boundaries of the 100-year and the 500-year flood have been delineated using the flood elevations determined at each cross

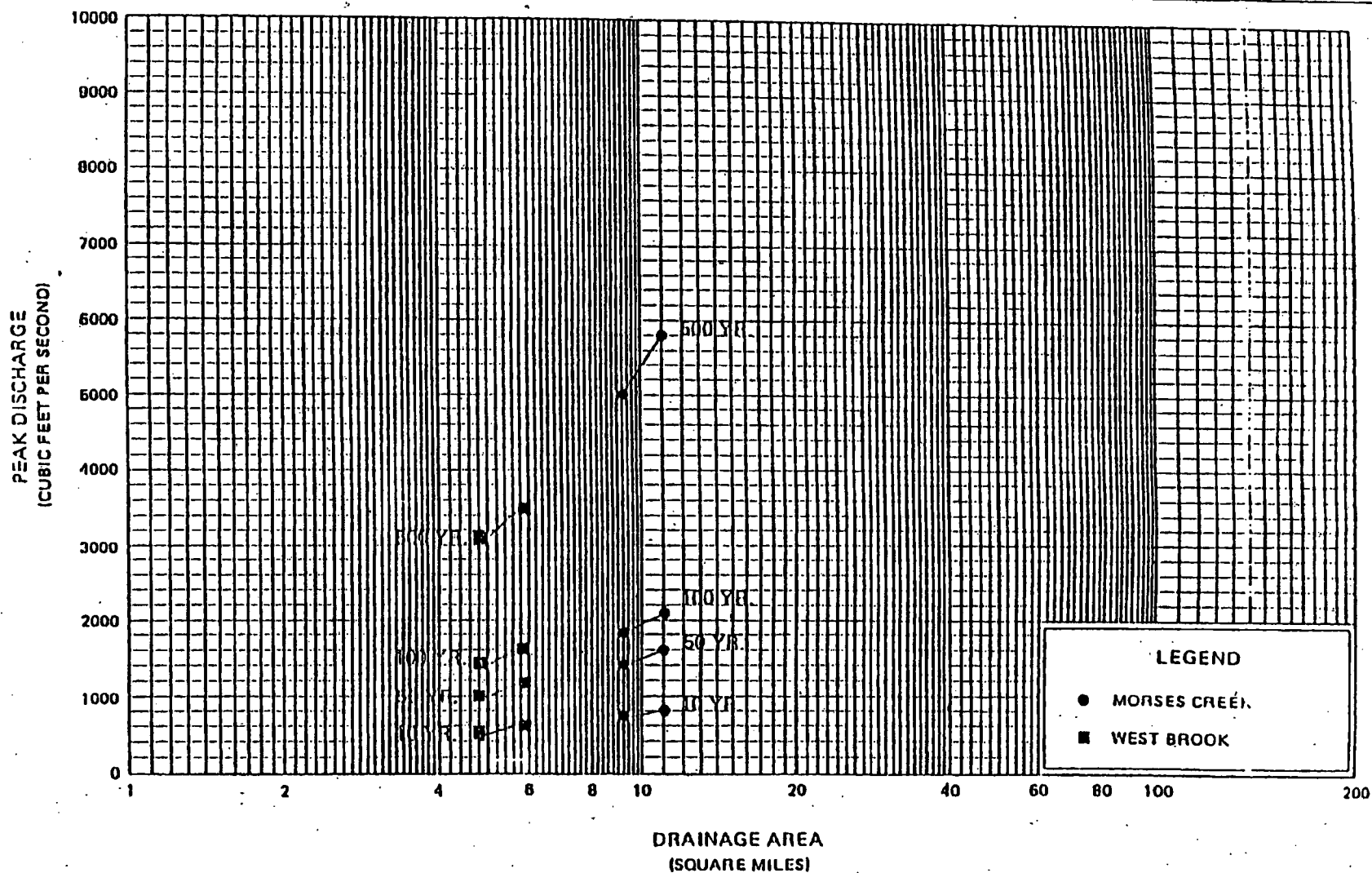


FIGURE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF LINDEN, NJ
[UNION CO.]

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

MORSES CREEK, WEST BROOK

NJDEP0000118

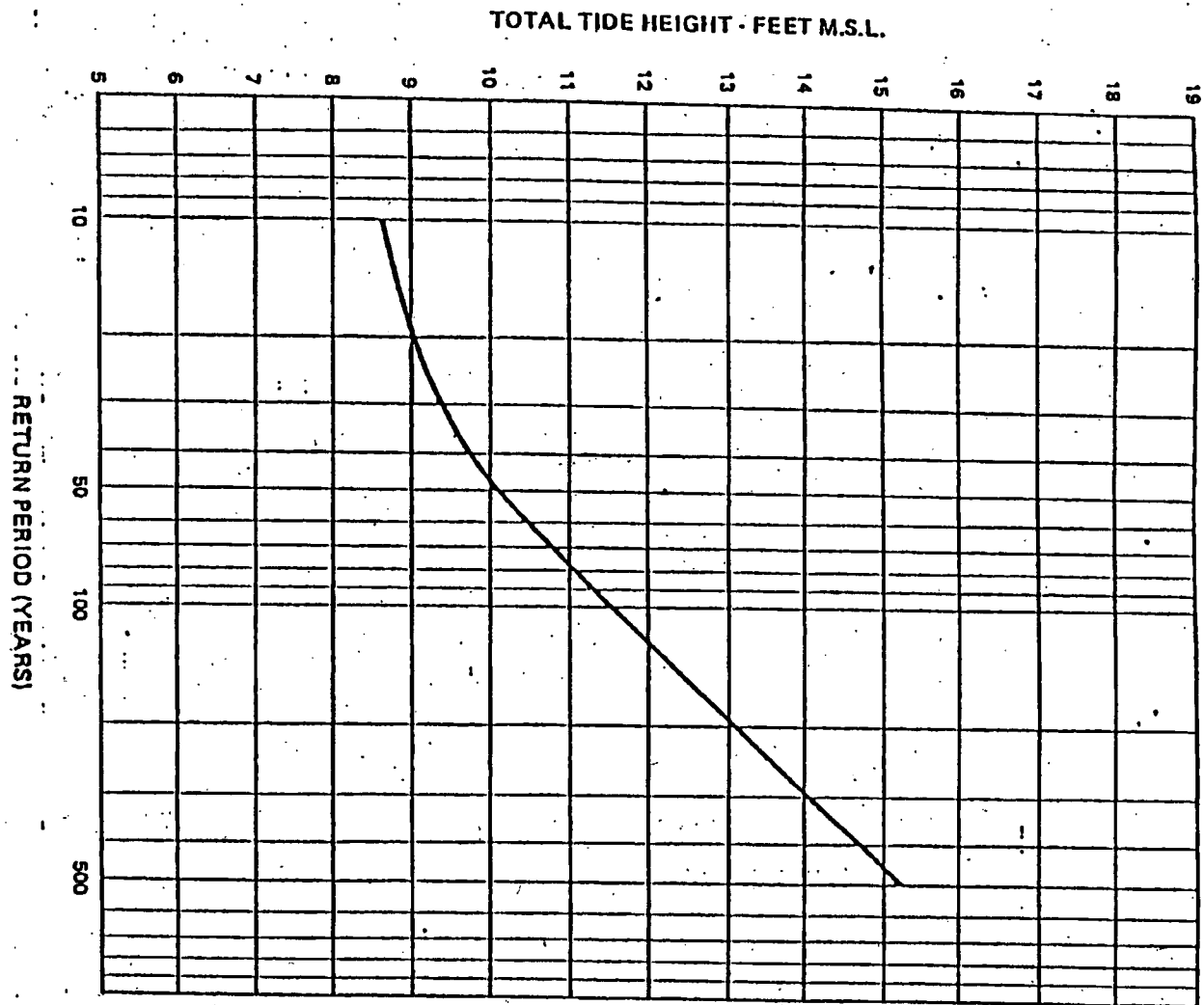


FIGURE 4

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF LINDEN, NJ
(UNION CO.)

TOTAL TIDE FREQUENCY CURVE

ARTHUR KILL AND RAHWAY RIVER

NJDEP0000119

section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000, with a contour interval of ten feet (Reference 8).

Although flood boundaries are normally shown on flood boundary maps, in this study, flood insurance zones have been used to indicate the flood boundaries. On these maps, the 100-year flood boundary coincides with the boundary of the areas of special flood hazards (Zones A0, A3, A5, A6, A7, and A11); and the 500-year flood boundary coincides with the boundary of areas of moderate flood hazards (Zone B). In cases where the areas of special flood hazards (Zones A0, A3, A5, A6, A7, and A11) are not bordered by areas of moderate flood hazards (Zone B), the 100-year and 500-year flood boundaries coincide.

Small areas within the flood boundaries may lie above the flood elevations, and therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodway

No floodways have been computed for the City of Linden in this report. There are floodways, however, in the original Flood Insurance Study; but New Jersey has now changed its criteria on the limitation of flood height increase from 1.0 foot to 0.2 foot. A Type 16 study is currently underway and an addendum to this report will be published containing the new floodway data as soon as the study is complete.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the Federal Insurance Administration has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source affecting Linden.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average

weighted difference in water-surface elevations between the 10- and 100-year floods. This difference did not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

<u>Average Difference Between 10- and 100-year Floods</u>	<u>Variation</u>
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

Twelve reaches meeting the above criteria were required for the flooding sources of Linden. These included one on Morses Creek, from its junction with Arthur Kill going 10,000 feet upstream into the Exxon Reservoir; two on Peach Orchard Brook, from its mouth at the Exxon Reservoir going 9,000 feet upstream to the corporate limits; three on West Brook, from its mouth at the Exxon Reservoir going 14,000 feet upstream to St. Georges Avenue; three on Kings Creek, from its junction with the Rahway River going 8,000 feet upstream to the beginning of the piped storm system, including a sheet flow reach on Kings Creek. Arthur Kill and the Rahway River, each with one reach, are subject to tidal flooding, although the wave velocities are attenuated by the channels.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Insurance Administration device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on FHF's from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10-year and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10-year and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective Flood Hazard Factors, the entire City of Linden was

divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A0:

Special flood hazard areas inundated by the 100-year flood, with shallow flood depths and/or unpredictable flow paths, i.e., sheet flooding.

Zones A3, A5, A6,
A7, All:

Special flood hazard areas inundated by the 100-year flood, with base flood elevations determined and zone designations assigned according to the Flood Hazard Factor.

Zone B:

Area between Zones A0, A3, A5, A6, A7, All, and the limits of the 500-year flood.

Zone C:

Area not subject to flooding by the 500-year flood.

Table 1, "Flood Insurance Zone Data," summarizes the flood elevation differences, Flood Hazard Factors, flood insurance zones, and base flood elevations for each flooding source in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for Linden is, for insurance purposes, the net result of the Flood Insurance Study. This is the official map on which the Federal Insurance Administration has delineated the flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. These maps are developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Insurance Administration.

6.0 OTHER STUDIES

The results produced by this study did not conflict with other available data or criteria.

FLOODING SOURCE	PANEL ¹	ELEVATION DIFFERENCE ³ BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION ³
		10% (10-YR)	2% (50-YR)	0.2% (500-YR)			
WEST BROOK							
REACH 1	03, 04	-2.6	-0.9	+3.6	025	A6	VARIES - SEE MAP
REACH 2	03	-5.7	-2.2	+2.0	055	A11	VARIES - SEE MAP
REACH 3	03	-2.9	-1.2	+3.6	030	A6	VARIES - SEE MAP
KINGS CREEK							
REACH 1	05	-2.7	-1.1	+3.7	025	A5	VARIES - SEE MAP
REACH 2	05		SHEET FLOW AREA			A0	1 FT. DEPTH APPROX.
REACH 3	06	-1.6	-0.5	+2.4	016	A3	VARIES - SEE MAP
ARTHUR KILL ⁴							
REACH 1	04, 06	-2.9	-1.3	+4.0	030	A6	12
RAHWAY RIVER ⁴							
REACH 1	05, 06	-2.9	-1.3	+4.0	030	A6	12
MORSES CREEK							
REACH 1	04	-2.8	-1.2	+4.0	030	A6	12
PEACH ORCHARD BROOK							
REACH 1	04	-1.7	-0.8	+4.0	015	A3	VARIES - SEE MAP
REACH 2	01, 02, 03, 04	-3.4	-1.3	+3.7	035	A7	VARIES - SEE MAP

¹ FLOOD INSURANCE RATE MAP PANEL

² WEIGHTED AVERAGE

³ ROUNDED TO NEAREST FOOT

⁴ TIDAL WAVE VELOCITIES ATTENUATED BY STREAM CHANNELS,
ZONE V6 SHOWN AS A6 IN TEXT AND ON MAPS.

TABLE 1

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF LINDEN, NJ
(UNION CO.)

FLOOD INSURANCE ZONE DATA

WEST BROOK, KINGS CREEK, ARTHUR KILL, RAHWAY RIVER,
MORSES CREEK, PEACH ORCHARD BROOK

NJDEP0000123

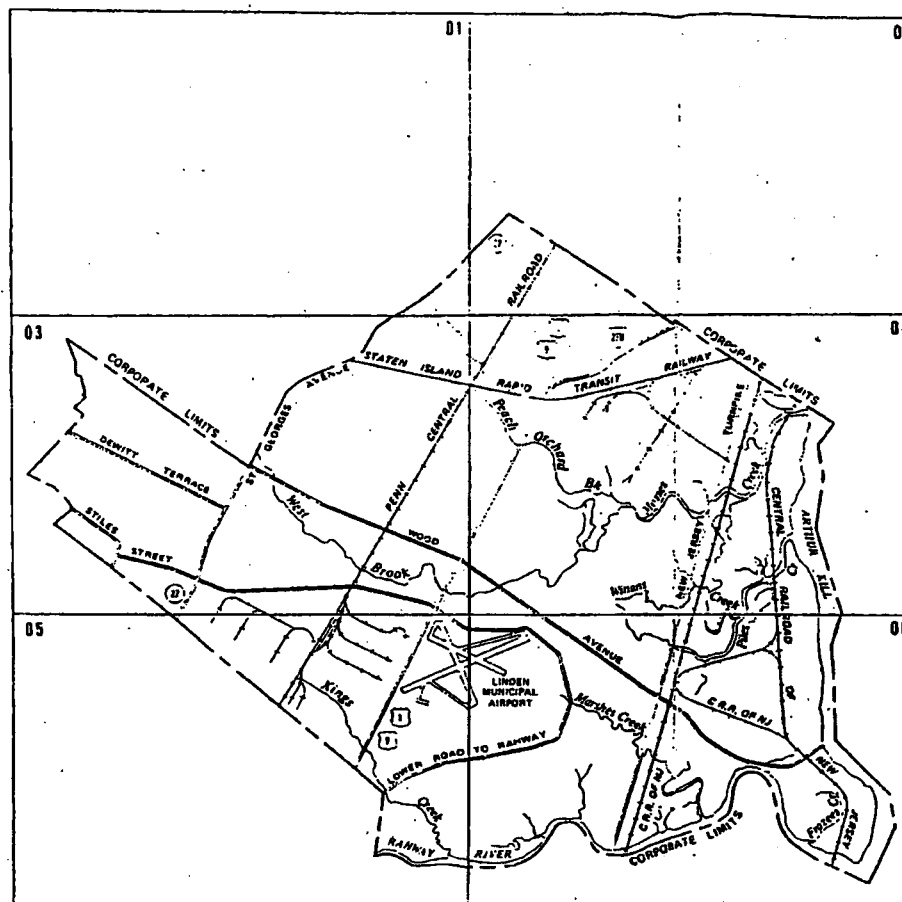
7.0 LOCATION OF DATA

All hydrologic and hydraulic data prepared for this study, including preliminary floodway computations, will be retained by the New York District, U. S. Army Corps of Engineers, for approximately five years.

8.0 BIBLIOGRAPHY AND REFERENCES

1. Benchmarks established 1928 for the City of Linden, provided by the City Engineers Office.
2. U. S. Army Corps of Engineers, Computer Program HEC-2 "Water-Surface Profiles".
3. -----, Log-Pearson Type III Analysis.
4. -----, New York District, Preliminary Flood Plain Information Report Data - City of Linden and Borough of Carteret, New Jersey.
5. Street Maps of the City of Linden, dated October 1962.
6. -----, New York District, Survey Sections.
7. Topographic Maps prepared for the City of Linden by James H. Fuertes, dated 1928.
8. U. S. Geological Survey 7-1/2-minute series Quadrangles; Perth Amboy, New York - New Jersey, Arthur Kill New York - New Jersey, Roselle, New Jersey, Elizabeth, New Jersey - New York, photorevised 1970.
9. Water Resources Council, Bulletin No. 15, "A Uniform Technique for Determining Flood-Flow Frequencies", December 1967.

NJDEP0000125

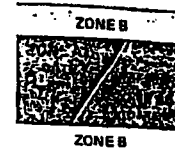


PANEL 07 AND 08 CONTAIN A TABULATION OF ELEVATION REFERENCE MARKS



KEY TO SYMBOLS

ZONE DESIGNATIONS* WITH
DATE OF IDENTIFICATION
12/2/76



Base Flood Elevation Line
with elevation in feet

Base Flood Elevation
uniform within zone

Elevation Reference Mark

River Mile

513

(EL. 103' MSL)

RM7

M1.5

*EXPLANATION OF ZONE DESIGNATIONS

A flood insurance map displays the zone designations for a community according to areas of anticipated flood hazards. The zone designations used by FIA are:

Zone	Description
A	Area of 100-year flood; base flood elevation and flood hazard factors not determined.
AD	Area of 100-year shallow flooding; flood depth 1 to 3 feet; product of flood depth, hazard and velocity (base per square foot) less than 15.
A1-A20	Area of 100-year flood; base flood elevation and flood hazard factors determined.
AB	Area of 100-year flood to be protected by a flood protection system under construction; base flood elevation and flood hazard factors not determined.
B	Area between limits of 100-year flood and 500-year flood; area of 100-year shallow flooding water depth less than 1 foot.
C	Area outside 500-year flood.
D	Area of undetermined, but possible, flood hazard.
V	Area of 100-year special flood with velocity factor present; base flood elevation and flood hazard factors not determined.
VO	Area of 100-year shallow flooding with velocity; flood depth 1 to 3 feet; product of depth, hazard and velocity (base per square foot) more than 15.
V1-V20	Area of 100-year special flood with velocity factor present; base flood elevation and flood hazard factors determined.

CONSULT NFIA SERVICING COMPANY OR LOCAL INSURANCE AGENT OR BROKER TO DETERMINE IF PROPERTIES IN THIS COMMUNITY ARE ELIGIBLE FOR FLOOD INSURANCE.

INITIAL IDENTIFICATION DATE:
JULY 18, 1976
CONVERSION TO REGULAR PROGRAM:
NOVEMBER 24, 1976

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

FLOOD HAZARD BOUNDARY MAP H - 01 06
FLOOD INSURANCE RATE MAP I - 01 06

MAP INDEX

CITY OF LINDEN, NJ
(UNION CO.)

COMMUNITY NO. 340467A



H&I-06

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF LINDEN, NJ
(UNION CO.)

APPROXIMATE SCALE
1000 0 1000 2000 3000 FEET

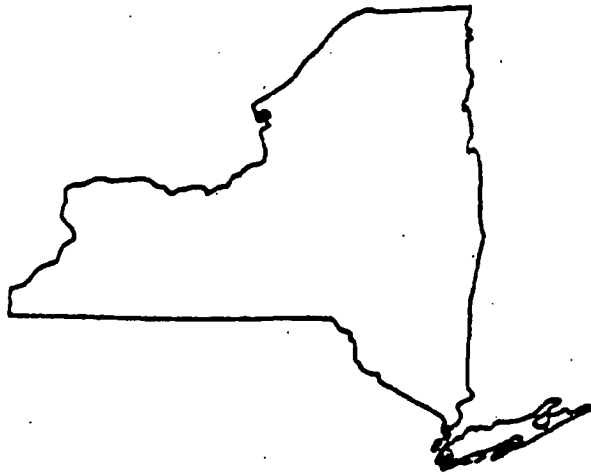
FLOOD HAZARD BOUNDARY MAP H-06
FLOOD INSURANCE DATE MAP

EXPIRATION DATE

FLOOD INSURANCE STUDY



CITY OF
NEW YORK,
NEW YORK
BRONX COUNTY,
QUEENS COUNTY,
NEW YORK COUNTY,
KINGS COUNTY,
RICHMOND COUNTY



MAY 16, 1993

Federal Emergency Management Agency

COMMUNITY NUMBER - 360497

NJDEP0000127



FLOOD INSURANCE STUDY
CITY OF NEW YORK, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of New York, New York, which includes Bronx, Kings, New York, Queens and Richmond Counties, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the City of New York to the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

This study was prepared by the New York State Department of Environmental Conservation for the Federal Emergency Management Agency, under Contract No. H-4784. The hydrologic and hydraulic analyses for this study were conducted by Camp, Dresser and McKee, Inc., under subcontract to the New York State Department of Environmental Conservation. This work was completed in December 1981.

1.3 Coordination

On April 23, 1976, a meeting was held to discuss the availability and type of mapping to be used in the study, community meetings, special flood problems and other requirements of the study. The meeting was attended by representatives of the New York City Planning Commission, the New York City Sewer Department, the New York City Building Department, the New York City Department of Environmental Protection, the mayor's

office, the borough president's office, the FEMA, the New York District of the U. S. Army Corps of Engineers (COE) and several consultant hydrologists.

On August 12, 1976, an initial Consultation and Coordination Officer's (CCO) meeting, attended by representatives of the FEMA, the City of New York, the New York State Department of Environmental Conservation (NYSDEC - the study contractor), the New York City Planning Commission, the New York City Sewer Department, and the New York City Building Department, was held to identify the flooding sources to be studied by detailed methods.

In February 1979, a meeting was held with representatives of the FEMA, the Borough President's office of each of the counties, the New York City Planning Department, the New York City Department of Environmental Protection, the New York City Department of Buildings and the New York City Office of Management and Budget. The meeting was held to explain the study and to obtain necessary input.

On April 5, 1979, a coordination meeting was held with all technical agencies having an interest in the study and from November 4 through 6, 1981, intermediate meetings were held with each of the five counties. In attendance at all or some of the meetings were representatives of the Borough President's offices; the New York City Building Department; the New York City Planning Department; the New York State Urban Development Corporation; Dewberry and Davis, Consulting Engineers; Camp, Dresser and McKee, Consulting Engineers (CDM); the NYSDEC; the New York City Environmental Protection Agency; the Port Authority of New York and New Jersey; the New York Housing Authority; and the FEMA.

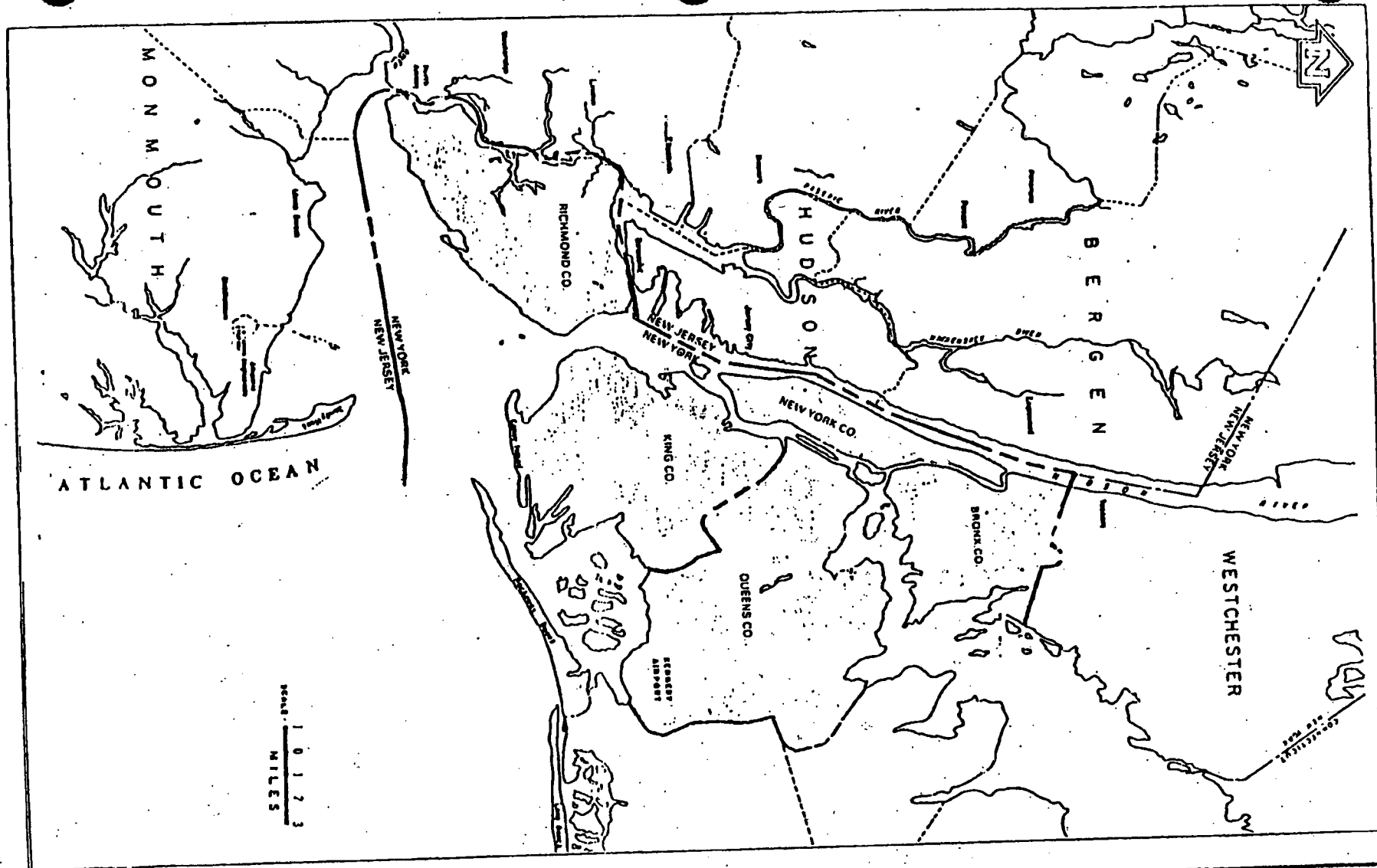
The results of this study were reviewed at a final CCO meeting held on December 13, 1982. The meetings were attended by representatives from the FEMA Region II Office, the study contractor, New York City and concerned citizens.

2.0 AREA STUDIED

2.1 Scope of Study

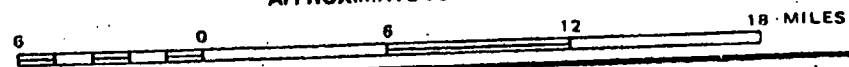
This Flood Insurance Study covers the incorporated area of the City of New York, New York, which includes Bronx, Kings, New York, Queens and Richmond Counties. The area of study is shown on the Vicinity Map (Figure 1).

Flood hazards studied by detailed methods include fluvial flooding, coastal flooding and tidal inundation. Fluvial or riverine flooding was



FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY OF NEW YORK, NY
 (BRONX CO., KINGS CO., NEW YORK
 CO., QUEENS CO. AND
 RICHMOND CO.)

APPROXIMATE SCALE



VICINITY MAP

FIGURE 1

NJDEP0000130

studied in detail along the Bronx River and portions of the Hutchinson River. A detailed coastal analysis of the Atlantic Ocean including wave action was performed for the entire shorelines of the Atlantic Ocean, Raritan Bay, New York Bay (including the Upper Bay, Lower Bay and the Narrows), Jamaica Bay, Long Island Sound and Little Neck Bay within the city and all the bays and inlets within these areas. The East River from the Throgs Neck Bridge to just above the Triborough Bridge was also included in the coastal analysis. Detailed analyses were performed for tidal inundation from the Atlantic Ocean affecting the previously mentioned shorelines and the Harlem, Hudson and Hutchinson Rivers, Arthur and Bronx Kills and Kill Van Kull for their entire lengths within the city. In addition, tidal inundation from the Atlantic Ocean affecting the East River from its mouth at lower Manhattan to just above the Triborough Bridge was also studied by detailed methods. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction for the next five years, through December 1986.

The east and west branches of Bodine Creek, Willow Brook, a tributary to Fresh Kills Creek and Springville, Upper Richmond, Upper Lemon and Sweet Brook Creeks were studied by approximate methods. Approximate methods of analysis were used to study those areas having low development potential and minimal flood hazards as identified at the initiation of the study. The scope and methods of study were proposed to and agreed upon by the FEMA.

2.2 Community Description

The City of New York is located in southeastern New York State and consists of Bronx County (Bronx Borough), Kings County (Brooklyn Borough), New York (Manhattan Borough), Queens County (Queens Borough) and Richmond County (Staten Island). The City of New York is bordered to the west and southwest in the State of New Jersey by Sandy Hook, the Towns of Middletown, Union Beach, Cliffwood-Cliffwood Beach, Lawrence Harbor, Sayreville, the City of South Amboy and the Boroughs of Keansburg and Keyport along the southern shore of Raritan Bay; the Cities of Perth Amboy, Linden, Elizabeth and Bayonne, the Township of Woodbridge, and the Borough of Carteret, located west of Staten Island; and the Cities of Jersey City and Hoboken, the Towns of West New York, and Guttenburg, the Townships of Weehawken, North Bergen and Tenafly, on the west side of the Hudson River. In the State of New York, communities bordering the City of New York to the north include the Cities of Yonkers and Mount Vernon, the Villages of Pelham Manor, Pelham, and New Rochelle. To the east of the City lie the Villages of Great Neck Estates and Atlantic Beach, North Hempstead and Hempstead. The surface area of the City of New York is 412.3 square miles (27 percent is under water) with a land area of 299.7 square miles. The city has an estimated coastline of 320 miles.

New York City originated in the spring of 1624 when 30 families arrived on Manhattan Island and constructed permanent dwellings on the southern shore, now known as the Battery. By 1700, the population has increased to 5,000. By this time, the docks along the coastline had been filled in with refuse and silt and paved over so that the docks could be extended. By 1800, the population of the city increased to 60,000. Staten Island had a population of 4,500. In 1834, Brooklyn became a city with a population of 24,000. By 1850, the population of New York City, still consisting only of Manhattan, had increased to 515,000. In 1898, greater New York originated by the merger of Manhattan with Brooklyn, Staten Island, Queens, and the Bronx. The correct borough name for Richmond County is also Richmond. However, the borough is most commonly referred to as Staten Island, which is used throughout this study. Today, the City of New York is the largest City in the United States and one of the largest cities in the world. The 1970 population of the city was 7,895,563 (Reference 1). The 1980 population of the city was 7,035,348 (Reference 2). The populations of the counties and boroughs in New York are shown in Table 1, "Population and Land Area of New York City."

TABLE 1 - POPULATION AND LAND AREA OF NEW YORK CITY

<u>County</u>	<u>Borough</u>	<u>1970 Census Population</u>	<u>1980 Census Population</u>	<u>Land Area (Sq. Miles)</u>	<u>1970 Population Density</u>
					<u>(Persons/ Sq. Mile)</u>
Bronx	Bronx	1,471,701	1,162,632	41.2	35,7200
Kings	Brooklyn	2,602,012	2,218,441	70.3	37,010
New York	Manhattan	1,539,233	1,418,124	22.7	67,810
Queens	Queens	1,987,174	1,886,550	108.0	18,400
Richmond	Staten Island	295,443	349,601	57.5	5,140

The following brief history of the Rockaway Peninsula and Jamaica Bay will provide some insight as to the reason data regarding the city's coastline and water area should be referenced to a specific time period.

In 1835, Rockaway Point was located near the present east boundary of Jacob Riis Park. East Rockaway Inlet was located 20,000 feet east of its present position, near Long Beach, New York. South of Rockaway Point, a large shoal had formed which was to provide the material for extending this point nearly four miles to the east during the next 100 years. The shoreline generally receded between 1835 and 1878 while, at the same time, Rockaway Point extended two miles westward. Jacob Riis Park acquired its present shoreline during this period.

Between 1878 and 1927, the shoreline of the Rockaways advanced a small amount. Rockaway Point grew rapidly until 1902, but from 1902 to 1927, its westward expansion was only half its previous rate. From 1927 to the present, the shoreline of the Rockaways has been stable. Nearly 12 million cubic yards of sand have been artificially placed east of Rockaway Point since that time.

Within Jamaica Bay, it has been estimated that 150 million cubic yards of material have been dredged in the past 40 years. The most common use for dredged material has been for fill purposes in land reclamation projects. Originally, almost all of the area surrounding Jamaica Bay except the barrier beach to the south was marshland. Today, due to extensive filling, the shoreline around the bay is quite different than it was 40 years ago.

Some of the larger projects in Jamaica Bay during this time were: Floyd Bennet Airfield at Barren Island; the development of the Mill Basin area by private developers; the construction of Canarsie Pier; the completion of the Shore Parkway over low-lying marshland; the City of New York Department of Parks reclamation work in connection with the building of Spring Creek Park; the fill around Broad Channel and Rulers Bar Hassock for the construction of Cross-Bay Boulevard in the 1920s; and the operations concerned with the development of John F. Kennedy Airport.

The excellent harbor facilities and location in respect to canal and railroad transportation systems have contributed to the growth of the City of New York. In addition to shoreline development associated with the cities commerce as a port, the high population density has caused development in areas subject to flooding.

Despite the proximity of the City of New York to the Atlantic Ocean and its numerous bays and rivers, the climate of the city is more continental than maritime. This is because the weather conditions affecting New York usually approach the city from the west. However, the maritime influence is not totally absent. During the summer, sea breezes moderate the heat, and during the winter, coastal storms accompanied by winds from the east may bring considerable amounts of rain or snow.

The mean annual temperature for the City of New York is 52.6 degrees Fahrenheit (°F). Subfreezing temperatures occur on an average of 92 days per year; however, subzero weather may occur only two days in every three winters. During an average summer, the temperature reaches the 90s°F on 7 days. Temperatures of 100°F or higher have occurred approximately 7 times since 1871.

Precipitation is moderate and is distributed evenly throughout the year. The normal annual precipitation is 42.92 inches; with approximately 25 inches occurring between April and October. A prolonged dry period may be expected approximately every two or three years, usually in September or October. Rainfall occurring between June and September is usually the result of thunderstorms and is brief and relatively intense. From October through April rainfall is generally associated with widespread storms generating day-long precipitation. The average annual snowfall is approximately 31 inches and occurs on an average of approximately 35 days between November and April (Reference 3).

The City of New York consists of three physiographically different areas. Bronx and New York Counties are an eroded southern extension of the glaciated upland area that occupies a large part of New England. The northern half of Kings and Queens Counties and all but a one mile wide strip on the southeastern shore of Richmond County consists of terminal moraine and the hilly till-covered area north of the terminal moraine. The remainder of these three counties are made up of glacial outwash plain.

The New York Bight is the geographic designation for the portion of the continental shelf bordered by the Atlantic Coastal Plain extending from Cape May, New Jersey, northeast to Montauk, Long Island. It is characterized by beaches, numerous shallow, irregular estuaries and bays, the most prominent of which is the estuary of the Hudson River. The Hudson River has drowned valley morphology. Sediment movement and deposition have resulted in significant changes in the shelf area nearest the bight.

Long Island Sound also has drowned valley morphology. The southern slope of the sound, near Long Island, is steep and smooth, reaching depths of over 140 feet.

New York Bay is divided into Upper New York Bay and Lower New York Bay by the Narrows. The Upper Bay is bounded by the Battery on the north and Fort Hamilton-Fort Wadsworth on the south. The Lower Bay is bounded by Fort Hamilton and Sandy Hook.

Raritan Bay is part of the system of interconnected bays and channels surrounding Staten Island and the northern coast of New Jersey. This system also includes Arthur Kill, Kill Van Kull and Newark Bay.

The Bronx River extends 23 miles from its mouth at the East River to Kensico Reservoir. The Kensico Reservoir does not release flows to the river, but serves as a water supply for the City of New York. From the

reservoir, the river flows through Westchester County. Within the City of New York, the Bronx River flows south from the Yonkers corporate limits through the center of the borough for approximately 8.7 miles to its mouth at the East River. The river once served as the border between the Cities of Yonkers and Mount Vernon; however, continued relocations of the river have altered this. Within the City of New York, a series of four dams cause a drop in elevation of approximately 40 feet. The dams limit backwater effects from reaching far upstream on the Bronx River. Within the city, the river drops a total of 60 feet before flowing into the East River between Hunts Point and Claron Point. The Bronx River has a drainage area of 56.4 miles at its mouth. Exclusion of the areas draining into four water supply reservoirs reduces the drainage area to 38.3 square miles. The average width of the drainage basin is 2.5 miles. Discharge data is available from USGS gaging station No. 01376500 at Bronxville, New York.

The Hutchinson River originates in New Rochelle and flows for approximately 11 miles to Long Island Sound. The Hutchinson River is tidally controlled for its entire length. Within the study area, the river drops approximately 225 feet and has a drainage area of 5.8 square miles. Discharge data for the Hutchinson River is available from USGS gaging station No. 013015 at Pelham, New York.

The Hudson River originates in the Adirondack Mountains. The river has a drainage area of 13,400 square miles, most of which lie in the northern and eastern parts of New York and in small portions of Vermont, Massachusetts, Connecticut and New Jersey. The lower Hudson is an estuary with tidal effects propagating 150 miles upstream to the Green Island Dam at Troy, New York, and downstream from the confluence of the Mohawk River.

The East River and the Harlem River serve as a connection between the Hudson River, the Upper Bay and Long Island Sound. The East River also serves as the boundary between southeast New York County and western Queens County, and between Bronx County and northern Queens County.

Jamaica Bay is a semi-enclosed body of water, sheltered from the Atlantic Ocean by the Rockaway Peninsula. The Rockaway Inlet is a long, narrow channel between the peninsula and Brooklyn, and is the only connection between the bay and the ocean. Many islands make Jamaica Bay into a network of channels and marshy areas.

2.3 Principal Flood Problems

The City of New York is affected by flooding from local, fluvial and coastal flooding. Local flooding refers to flooding of inland portions of the city from short-term, high-intensity rainfall in areas with poor drainage.

Fluvial flooding is caused by rivers and streams overflowing their banks. Most of the rivers within the City of New York are tidally influenced. This means that water levels in the rivers are controlled by the tidal conditions at the mouth of the river with little or no influence from the flow in the stream. Both fluvial and tidal flooding associated with waves occur within the study area; however, tidal flooding was found to be the primary cause of damage within the city.

Coastal flooding is caused by long and short wave surges that affect the shores of the open ocean, bays and tidally influenced rivers, streams and inlets. The movement of coastal waters is influenced by the astronomic tide and meteorological forces such as northeasters and hurricanes. Hurricanes and northeasters have historically caused flooding in and around the study area. Inundation of low-lying coastal areas in the City of New York is primarily the result of storm surges, wave setup and wave runoff which occur during hurricanes and northeasters.

The City of New York is built in a confined coastal location, which accounts for much of its natural protection against hurricanes. The strongest winds from a storm rarely reach New York since the New Jersey coast is on one side of the city and Long Island is on the other side. However, high storm surges can propagate within the New York Bight and cause severe flooding along the coastal portions of the city. Moreover, the cup-like topography of the area accounts for most of the dynamic effects, including resurgence, which cause the waters to oscillate to flood levels well after the storm has left the area.

Sections of Queens, Brooklyn, and Staten Island are exposed to direct ocean surges and waves. Coney Island and the Rockaway Peninsula are particularly vulnerable to wave damage. On Rockaway Peninsula and Jamaica Bay, the shoreline configuration has changed considerably over the past 50 years due to dredging and filling. These changes affect wave propagation, particularly in areas such as Rockaway Point at Rockaway Inlet, where the configuration of the point controls the direction of the incoming waves. Surge waves can also propagate through Long Island Sound. Consequently, a surge wave along the East River can propagate in the New York Bight, into New York Bay through the Hudson River and enter the East River from the south.

Jamaica Bay is affected by astronomical tides, storm surges from the Atlantic Ocean off New York Bay, wind generated wave setups within the bay and rainfall runoff from other areas (Reference 4). The outer shoreline of the Rockaway Peninsula is subject to tidal fluctuations from the Atlantic Ocean. The Rockaway Peninsula is a surge barrier to Jamaica Bay; however, a storm surge can almost entirely inundate the peninsula.

The most severe flooding conditions result from the overtopping of the peninsula. The low-lying areas of Brooklyn and Queens including Kennedy Airport are directly affected by flooding from Jamaica Bay.

The northern portion of Queens and the east Bronx are directly affected by surges originating in Long Island Sound. The east shore of City Island has a history of severe damage. In 1969, it was estimated that a recurrence of the 1938 hurricane, the storm of record, would produce \$23 million of damage on City Island alone.

Detailed descriptions of coastal flood damage in and around the City of New York caused by the November 1950, November 1953, September 1960 and March 1962 storms are presented in Study Overview (Reference 5).

The storm of November 1950 caused millions of dollars worth of damage and required evacuation of many parts of New York. Damage as a result of the flood occurred in parts of Queens, Jamaica Bay, Brooklyn, Rockaway Point and Staten Island. Tides inundated portions of Staten Island for up to one mile inland.

Damages on Staten Island during the storm of November 1953 totaled almost \$1,000,000. During this flood, Rockaway Point beaches were severely eroded and the protective dunes were leveled. Homes along the ocean and bay were inundated by one to two feet of water. Waves crest heights ranged to an estimated 25 feet along the Atlantic Ocean.

The tide of record (8.6 feet at Fort Hamilton, Brooklyn, New York) resulted from the hurricane of September 1960. The City of New York experienced damage estimated at close to \$20,000,000.

As a result of the March 1962 storm, the City of New York experienced damages totaling approximately \$17,000,000. Portions of Coney Island and Rockaway Beach were inundated by one to two feet of water.

2.4 Flood Protection Measures

Numerous flood protection measures have been developed in the City of New York. Many portions of the city are subjected to the direct influence of the ocean and have had bulkheads constructed for the purpose of beach stabilization. Riprap and seawalls have been constructed to dissipate waves caused by tidal action. Much construction has been elevated or protected to prevent extensive flood damage. In order to comply with requirements allowing citizens to be eligible for the Flood Insurance Program, the City of New York calls for all new construction to be protected to a specified elevation. A summary of flood protection measures for Staten Island, the Rockaway Peninsula and Jamaica Bay is presented in Study Overview (Reference 5).

The City of New York has an intricate navigational system. While the purpose of the system is not to provide flood protection, the existence of well maintained channels assures a relatively unrestricted flow of water throughout the area.

The principal deep water channels of the port of New York include: Ambrose Channel, from the Atlantic Ocean into Lower New York Bay; Anchorage Channel, in Upper New York Bay; and the Hudson River Channel, up to 59th Street. These channels have a depth of 45 feet and a width of 2,000 feet. Buttermilk, Bay Ridge and Red Hook Channels, the East River to the Brooklyn Navy Yard and tributary channels all have depths of 40 feet. Kill Van Kull and Arthur Kill Channels, known as the New York and New Jersey Channels, respectively, have a separate entrance to the ocean by way of Bayside Channel and have depths of 35 feet. A recently authorized modification provides a new entrance channel replacing the eastern portion of the Bayside-Gedney Channel. The East River has been improved to a point 35 feet beyond the Navy Yard. Secondary channels such as Gowanus Creek, Newtown Creek, Coney Island Channel, Rockaway Inlet, Jamaica Bay and the Harlem River have depths ranging from 15 to 30 feet.

Federal construction and maintenance costs now total more than \$200 million since the first dredging and removal of rock obstructions at Hells Gate in the East River was undertaken by the COE in 1853. The average annual commerce in the Port of New York between 1966 and 1975 was over 180 million tons. Commerce including waste material during 1975 was more than 177 million tons. While the port has naturally deep water harbors and channels, extensive improvements have been made over the last 150 years. Some of the current active projects are listed below and detailed descriptions can be found in Water Resources Development in New York (Reference 6).

- Bay Ridge and Red Hook Channels
- Bronx River - Channel Improvement
- Buttermilk Channel
- Coney Island Channel
- Coney Island Creek - Channel Improvement
- East Chester Creek - Channel Improvement
- East Chester Bay - Channel Improvement
- East River - Channel Improvement
- East Rockaway Inlet - Channel Improvement
- Flushing Bay and Creek - Channel and Anchorage Area Improvement
- Gowanus Creek Channel

- Great Kills Harbor
- Harlem River - Channel Improvements
- Hudson River Channel, New York and New Jersey
- Jamaica Bay - Channel Improvement
- Newtown Creek - Channel Improvement
- New York and New Jersey Channels
- New York Harbor - Entrance Channels and Anchorage Areas
- Sheepshead Bay - Channel Improvement
- Wallabout Channel - Channel Improvement
- Westchester Creek - Channel Improvement

2.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one-percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten) and, for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

This Flood Insurance Study for the City of New York separately examined the impact of fluvial flooding, coastal flooding caused by hurricane surges, and coastal flooding caused by northeasters. Since the causes of flooding are independent, the separate results were combined in a probabilistic sense. A wave height analysis was also performed to account for the inclusion of short period, wind induced waves. The extensive hydrologic and hydraulic analyses necessary to accomplish this study have been documented in a series of reports prepared for the NYSDEC (References 5, 7, 8, 9, 10, 11, 12 and 13).

3.1 Fluvial Analysis

3.1.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency and peak elevation-frequency relationships for floods of the

selected recurrence intervals for each flooding source studied in detail affecting the community.

Riverine flooding affects only a small portion of flood prone areas in the City of New York, primarily in the Borough of the Bronx. Flooding from the Bronx and Hutchinson Rivers may potentially cause overbank flooding in the northern portion of the city.

From the Flood Insurance Study for Mount Vernon, New York, it was determined that flooding along the portions of the Hutchinson River downstream of East Sanford Boulevard was completely tidally controlled; therefore no fluvial analyses was performed (Reference 14). The stage-frequency analysis for the Hutchinson River in the Bronx is, therefore, performed as part of the coastal analysis in this study.

For the Bronx River, a log-Pearson Type III distribution of the annual peak flows was used to generate discharge-frequency relationships recorded at the USGS gage #01376500 at Bronxville, New York (36 years of record) (References 15 and 16). Discharge-frequency estimates were made for other points along the Bronx River by adjusting the discharge-frequency curve at the gaging station according to the ratios between corresponding drainage areas, main channel slopes, surface storage indexes, and indexes of manmade impervious cover. The procedure is documented in a report prepared for the NYSDEC (Reference 9). A similar procedure was used to study New Jersey by the State of New Jersey Department of Environmental Protection (Reference 17).

A summary of the drainage area-peak discharge relationships for the Bronx River is shown in Table 2, "Summary of Discharges."

TABLE 2 - SUMMARY OF DISCHARGES

<u>FLOODING SOURCE AND LOCATION</u>	<u>DRAINAGE AREA (sq. miles)</u>	<u>PEAK DISCHARGES (cfs)</u>			
		<u>10-YEAR</u>	<u>50-YEAR</u>	<u>100-YEAR</u>	<u>500-YEAR</u>
BRONX RIVER					
At USGS gage at Bronxville	26.5	1,875	2,847	3,358	4,823
At East 238th Street (corporate limits)	31.4	2,065	3,125	3,680	5,250
At East Gun Hill Road	34.4	2,175	3,286	3,866	5,495
At confluence with East River	38.3	2,312	3,486	4,097	5,798

3.1.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the riverine flooding source studied in detail were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along this flooding source.

Cross sections for the upper portions of the Bronx River were adopted from the Flood Insurance Study for the City of Mount Vernon (Reference 14). Additional cross sections were surveyed within the study area. Cross sections were located at close intervals above and below bridges and culverts in order to compute the significant backwater effects of these structures. All bridge and culverts were surveyed to obtain elevation data and structural geometry.

Roughness coefficients (Manning's "n") for the Bronx River ranged from 0.035 to 0.045 for the channel and from 0.055 to 0.095 for the overbank areas. These values were determined using Water-Supply Paper 1849 (Reference 18).

The water-surface elevations on the Bronx River were determined using the COE HEC-2 step-backwater computer program (Reference 19). The HEC-2 streamflow model was calibrated to the storms of June 1972 (Hurricane Agnes) and September 1975 (Hurricane Eloise). Starting water-surface elevations were calibrated to observed readings at the USGS gaging station at Bronxville.

A discussion of fluvial flooding affecting the streams studied by detailed and approximate methods is presented by the NYSDEC in Analysis of Fluvial Flooding (Reference 9).

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 3).

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are valid only if hydraulic structures remain unobstructed and do not fail.

3.2 Coastal Stillwater Analyses

Coastal stillwater analysis was performed for the Harlem, Hudson, Hutchinson and East Rivers, Arthur and Bronx Kills and Kill Van Kull, the

Atlantic Ocean, Raritan Bay, New York Bay, Jamaica Bay, Long Island Sound, Little Neck Bay and all the bays and inlets within these areas.

The City of New York and the New York Bight area are affected equally by hurricanes and northeasters. The extent of coastal flooding due to hurricanes and northeasters is determined by three factors: (1) the nature of the storm with respect to intensity, duration and path, (2) astronomic tide conditions at the time the storm-surge wave reaches the shore and (3) the physical geometry and bathymetry of a particular area, which affects the timing and passage of the surge wave.

For the coastal flooding sources studied by detailed methods, surge depths were determined independently of the astronomic tide by the application of a synthetic storm to generate surges. The propagation of surges through the entire waterway system is simulated by use of mathematical models which dissipate the surge waves in a manner consistent with the physical and hydraulic properties of the waterway system and determine elevations at any selected location along the coast. An off-shore surge generation model was used to generate surges from hurricanes over the continental shelf. An embedded link-node network model was used to propagate the surge inland through the New York Bight and into the harbor and bays. The second model enables a finer spatial resolution for computing storm surges at all coastal locations in the city. A different set of models was developed which included a northeaster wind field algorithm to properly simulate the surge producing mechanisms of northeasters.

The two models were calibrated to astronomic tidal conditions to establish the hydrodynamic characteristics of the study area. The models were then calibrated to Hurricane Carol (1954) and verified against Hurricanes Edna (1954) and Donna (1960), and the hurricane of 1938. The northeaster wind algorithms were calibrated and verified using 13 historical northeasters.

Observed historical data were used to develop discrete distributions of storm surge events that have the potential to occur. Total stillwater elevations were determined by combining each stillwater elevation with the complete range of local tidal conditions also based on historical data and accounting for non-linearities in the combination. Thus, a simulation of 252 hurricanes and 42 northeasters at 50 phases of 5 tides resulted in 73,500 simulated flooding events for each point of interest in the study area.

The Joint Probability Method (JPM) was used to determine the stillwater elevations at specific recurrence intervals (Reference 20). Application

of the JPM consisted of assigning annual probabilities of occurrence to each synthetic storm based on the probabilities of its characteristics. The resulting peak tide levels from each synthetic storm were summed in half foot increments from 0 to 20 feet at each selected point. Cumulative annual exceedence probabilities at each point were obtained by summing the annual occurrence probabilities from high to low elevations. Finally, hurricane and northeaster frequency curves were combined by summing annual exceedence probabilities. The resulting coastal stillwater elevations for the 10-, 50-, 100- and 500-year recurrence intervals at selected locations in the study area presented in Table 3, "Summary of Elevations." A discussion of the statistical analysis of historical hurricanes, the modeling of hurricane surges, simulation of northeasters, and determination of total stillwater elevations is documented in a series of reports prepared for the NYSDEC (References 8, 10, 11 and 12).

3.3 Wave Height Analysis

The wave height analysis was carried out to provide estimates of the elevations of floods of the selected recurrence intervals along the shoreline of the Atlantic Ocean, Raritan Bay, New York Bay, Jamaica Bay, Long Island Sound, Little Neck Bay and the East River.

The destructiveness of high stillwater elevations due to coastal flooding may be increased by wind induced waves which contribute to increased water levels and whose size and velocity may damage structures directly. The height of a wave is dependent upon wind speed and its duration, depth of water, and length of fetch. The wave crest elevation is the sum of the stillwater elevation and the portion of the wave height above the stillwater elevation.

Areas of coastline subject to significant wave attack are referred to as coastal high hazard zones. The COE has established the 3-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones (Reference 21). The 3-foot wave has been determined as the minimum size wave capable of causing major damage to conventional wood frame or brick veneer structures. The V-zone limits are depicted at locations where there is no longer sufficient depth to support a 3-foot breaking wave. However, when the beach profile is eroded during the 100-year flood event with severe wave conditions, the V-zone limit is moved inland to locations where a 3-foot water depth could be supported by the eroded profile. The V-zone elevations are interpolated between transects to give their areal extent.

The wave crest analysis was conducted according to the methodology developed by the National Academy of Sciences (NAS) and adopted by the

FEMA as a standard component of coastal flood insurance studies (Reference 22). The required computations for the analysis were performed using the WHAFIS computer program (Reference 23). Wave heights were computed along transects which were located perpendicular to the average mean shoreline. The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, the transects were spaced at larger intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects.

A total of 125 transects were coded and wave crest elevations and flood hazard factors were computed using the WHAFIS program (Reference 23). Accurate topographic, land-use, and land cover data are required for the coastal analysis. Maps of the study area at a scale of 1:4,800 with a contour interval of 2 feet and aerial photographs at a scale of 1:12,000 were used for the topographic data (References 24 and 25). The land-use and land cover data were obtained through field surveys.

The number and location of transects were chosen to be representative of uniform lengths of the coastline with little variation of the 100-year stillwater levels. The transects are named for the specific region they represent and are labeled as follows:

- BX - Bronx
- SI - Staten Island
- BK - Brooklyn
- JB - Jamaica Bay
- MH - Manhattan
- QU - Queens

In all cases, transects were oriented to represent the worst possible fetch conditions. For example, all transects on Rockaway Peninsula were computed with the wind blowing from the ocean to represent the worst conditions for the southern shores, and with the wind blowing across Jamaica Bay to represent the worst conditions for the northern shoreline.

For transects located on enclosed embayments, the longest possible overwater fetch length that could affect the area was used to compute the wave heights. Figure 2 illustrates the location of the transects for the community and Table 4. "Transect Descriptions" provides a physical description of the area along the shoreline represented by each transect. In areas of uncertainty, additional intermediate transects were coded and analyzed.

Along each transect, wave heights and wave crest elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. Each transect extends far enough inland from the coast to cover all open areas (bays, rivers and open marsh) and extends to a point high enough to match the 100-year flood elevation. Wave heights were calculated to the nearest 0.1 foot, and wave crest elevations were determined at whole-foot increments along the transects. The calculations were carried inland along the transect until the wave crest elevation was permanently less than 0.5 foot above the stillwater elevation or until the coastal flooding met another flooding source (i.e. riverine) with an equal water-surface elevation. The results of the calculations are considered accurate until local topography, vegetation, or cultural development within the community undergo any major changes.

Figure 3 represents a sample transect which illustrates the relationship between the stillwater elevation, the wave crest elevation, the ground elevation profile, and the location of the A/V zone boundary.

For each transect, the program produces a maximum wave height elevation which defines the inland extent of flooding. Between transects, height elevations are interpolated to give the areal extent of flooding, shown as numbered A and V zones.

A complete discussion of the wave height analysis included in this study is presented in a report prepared for the NYSDEC (Reference 13).

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the maps.

The stillwater elevations and maximum wave crest elevations of the selected recurrence intervals are shown in Table 3, "Summary of Elevations".

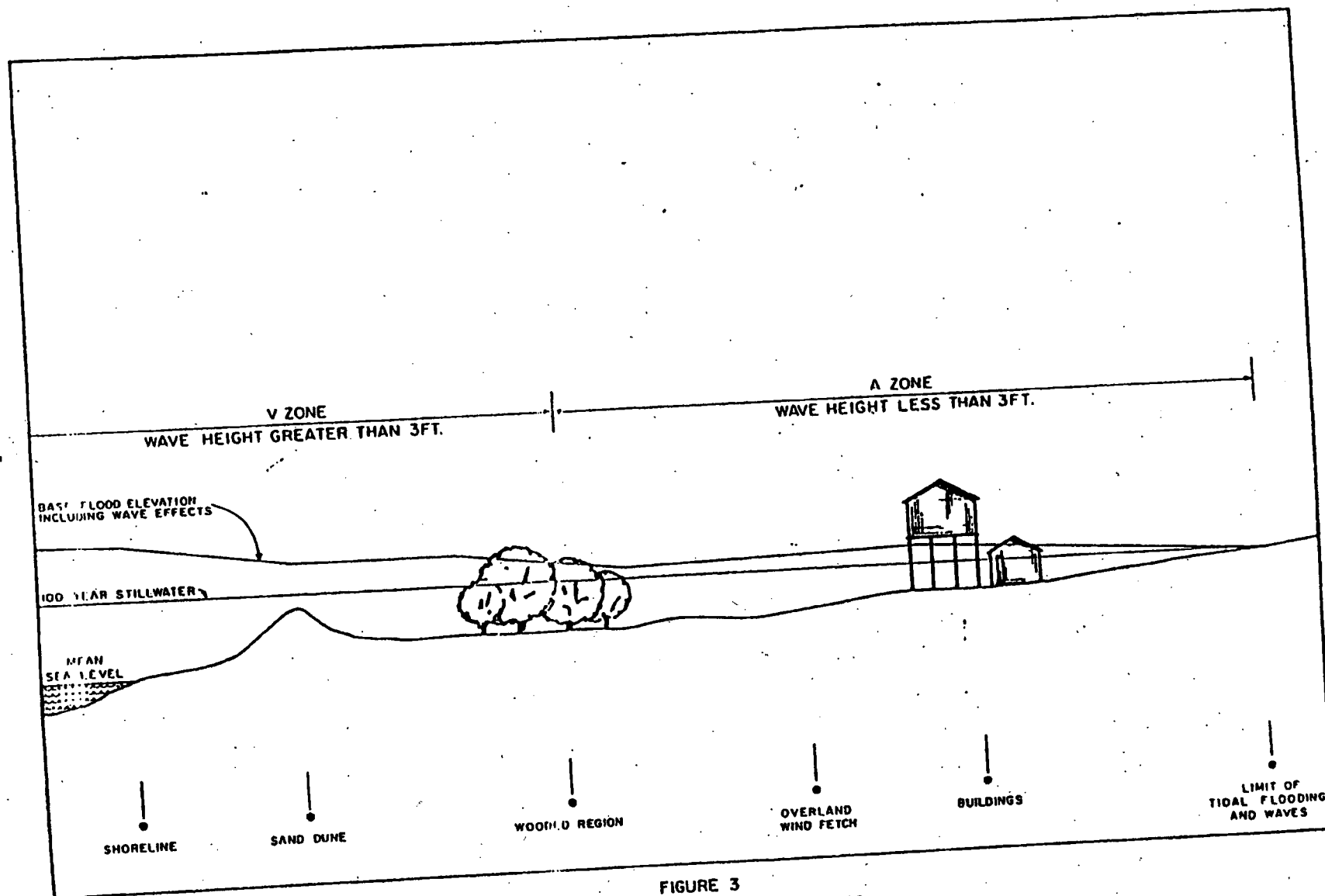


FIGURE 3
TYPICAL TRANSECT SCHEMATIC

NJDEP0000146

TABLE 3 - SUMMARY OF ELEVATIONS

<u>FLOODING SOURCE AND LOCATION</u>	<u>ELEVATION (feet)</u>			
	<u>10-YEAR¹</u>	<u>50-YEAR¹</u>	<u>100-YEAR</u>	<u>500-YEAR¹</u>
ARTISTE KILL				
At confluence with Haritan Bay	7.6	9.3	10.1 ¹	12.2
At Outerbridge crossing	7.4	9.1	9.6 ¹	11.7
At Bloomingdale Road (extended)	7.1	8.7	9.6 ¹	11.3
At Victory Boulevard (extended)	6.5	8.0	8.6 ¹	10.4
At Richmond Terrace (extended)	6.5	7.8	8.3 ¹	10.0
ATLANTIC OCEAN				
At Rockaway Beach shoreline	7.4	9.1	9.6/15 ²	12.2
At Rockaway Inlet Lower Bay	6.6	8.1	8.9/13 ²	11.0
BRONX KILL				
East of Triborough Bridge approach	9.2	11.3	12.5 ¹	15.4
At confluence with Harlem River	8.5	10.4	11.3 ¹	14.1
BRONX RIVER				
At mouth	9.8	12.1	13.3 ¹	16.7
EAST RIVER				
At confluence with Upper Bay	7.5	9.6	9.7 ¹	11.9
At Brooklyn Bridge	7.3	8.9	9.6 ¹	11.8
At Queensboro Bridge	7.2	8.8	9.6 ¹	12.0
At Roosevelt Island	8.1	9.1	10.8 ¹	13.4
East of New York, New Haven, and Hartford Railroad Bridge	8.5	10.4	11.4 ¹	14.1
At Rikers Island	9.2	11.3	12.5/17 ²	15.6
At Bronx Whitestone Bridge	9.7	12.0	13.2/17 ²	16.2
At Throgs Neck Bridge	9.8	12.2	13.5/17 ²	16.5
HARLEM RIVER				
At confluence with East River	9.6	11.8	13.0 ¹	16.0

¹Stillwater Elevation

²Stillwater Elevation/Maximum Wave Crest Elevation

TABLE 3 - SUMMARY OF ELEVATIONS - continued

FLOODING SOURCE AND LOCATION	ELEVATION (feet)			
	10-YEAR ¹	50-YEAR ¹	100-YEAR ¹	500-YEAR ¹
HARLEM RIVER - continued				
At confluence with Bronx Kill	8.8	10.4	11.3 ¹	14.1
North of Macombs Dam Bridge	6.9	9.2	10.0 ¹	12.5
At University Heights Bridge	6.8	8.7	9.4 ¹	11.7
At confluence with Hudson River	7.1	8.6	9.4 ¹	11.7
HUDSON RIVER				
At confluence with Upper Bay	7.4	9.0	9.7 ¹	11.9
At George Washington Bridge	7.3	8.8	9.6 ¹	11.7
At corporate limits	6.9	8.4	9.2 ¹	11.6
HUTCHINSON RIVER				
At mouth	9.9	12.4	13.7/16 ²	16.8
At corporate limits	10.1	12.7	14.0/16 ²	17.4
JAMAICA BAY	6.0	7.2	7.9/11 ²	9.7
KILL VAN KULL				
At confluence with Newark Bay	6.4	7.6	8.3 ¹	9.5
At confluence with Upper Bay	6.9	8.5	9.0 ¹	10.9
LONG ISLAND SOUND				
At confluence of East River	9.9	12.4	13.7/21 ²	16.7
At northern corporate limits	9.7	12.2	13.6/21 ²	16.5
At Little Neck Bay	10.0	12.5	13.8/21 ²	16.7
At Basin Park	9.8	12.0	12.9/15 ²	14.9
LOWER BAY				
South of The Narrows Bridge	7.4	9.0	9.7/15 ²	11.9
At Gravesend Bay	7.4	9.0	9.7/15 ²	11.9
NEWARK BAY	6.4	7.7	8.2 ¹	9.5

¹Stillwater Elevation

²Stillwater Elevation/Maximum Wave Crest Elevation

TABLE 3 - SUMMARY OF ELEVATIONS - continued

FLOODING SOURCE AND LOCATION	ELEVATION (feet)			
	10-YEAR ¹	50-YEAR ¹	100-YEAR	500-YEAR ¹
RARITAN BAY				
From Great Kills Park to Lower Bay	7.5	9.1	9.9/15 ²	12.0
From Great Kills Park to Arthur Kill	7.7	9.4	10.2/16 ²	12.3
UPPER BAY				
North of The Narrows Bridge	7.4	8.9	9.7/14 ²	11.8
At Governors Island	7.5	9.0	9.8/14 ²	11.8

¹Stillwater Elevation

²Stillwater Elevation/Maximum Wave Crest Elevation

A physical description of the area along the shoreline represented by each transect is shown in Table 4, "Transect Descriptions."

TABLE 4 - TRANSECT DESCRIPTIONS

Transect	Location	Elevation (feet)	
		Stillwater 100-year	Maximum Wave Crest 100-year
No. BX-10	In Long Island Sound from northern corporate limits to southern end of Twin Islands including eastern shore of Pelham Bay Park and Hunters Island	13.6	21
No. BX-20	From southern tip of Twin Islands to 100 feet south of Terrace Street on City Island	13.6	21
No. BX-30	From 100 feet south of Terrace Street to Fordham Street, extended	13.6	21
No. BX-40	From Fordham Street, extended, to southern end of City Island	13.8	20
No. BX-50	Entire shoreline of Hart Island in Long Island Sound	13.6	21
No. BX-60	From southern end of City Island to Throgs Neck Bridge at Locust Point including shoreline of Eastchester Bay and the Hutchinson River	13.7	21
No. BX-70	From Throgs Neck Bridge at Locust Point to Throgs Neck Bridge at Throgs Point	13.7	21

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

**CITY OF
NEW YORK,
NEW YORK--
BRONX, RICHMOND,
NEW YORK, QUEENS
AND KINGS COUNTIES**

PANEL 91 OF 131
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER

360497 0091 B

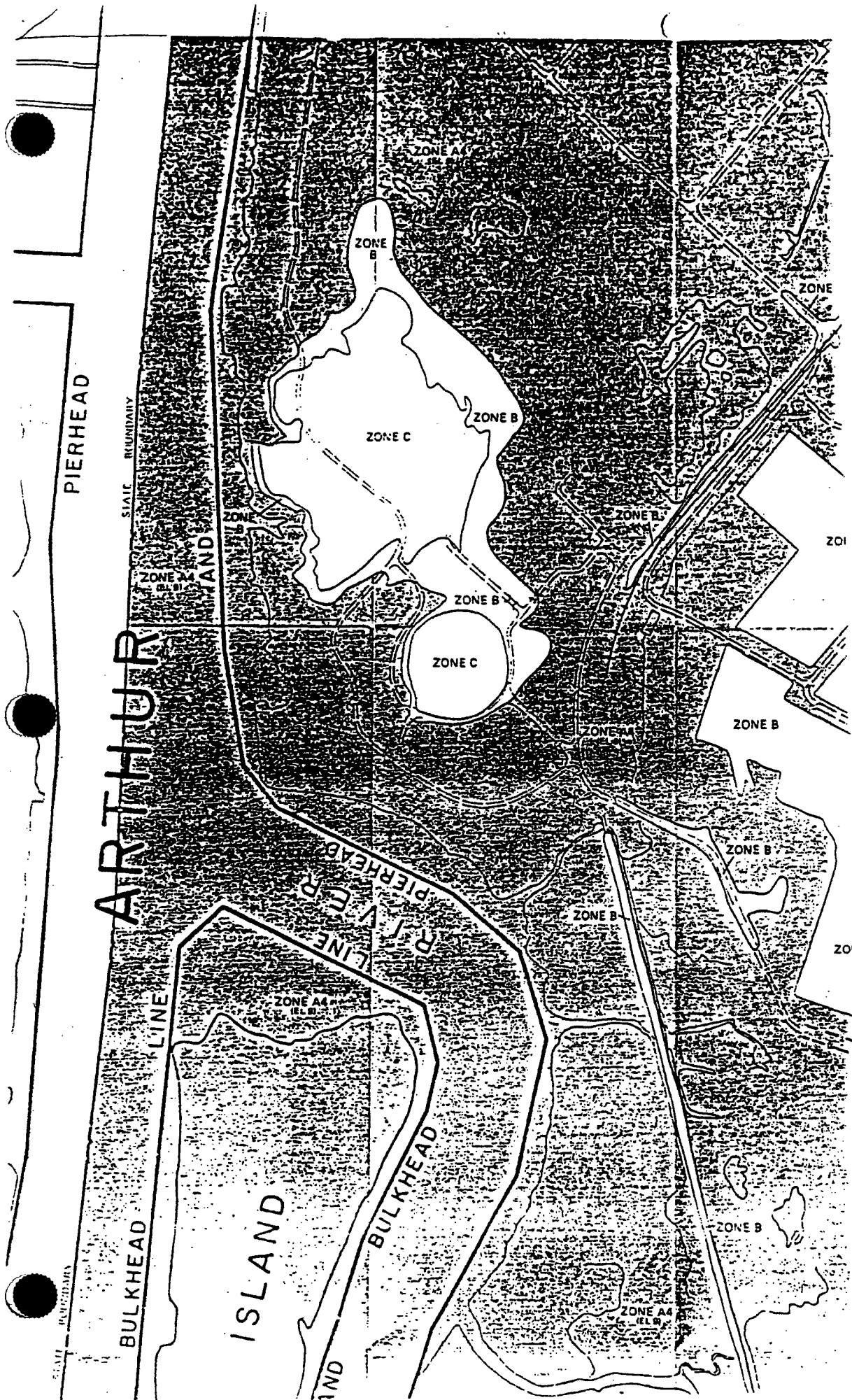
EFFECTIVE DATE:

NOVEMBER 16, 1983

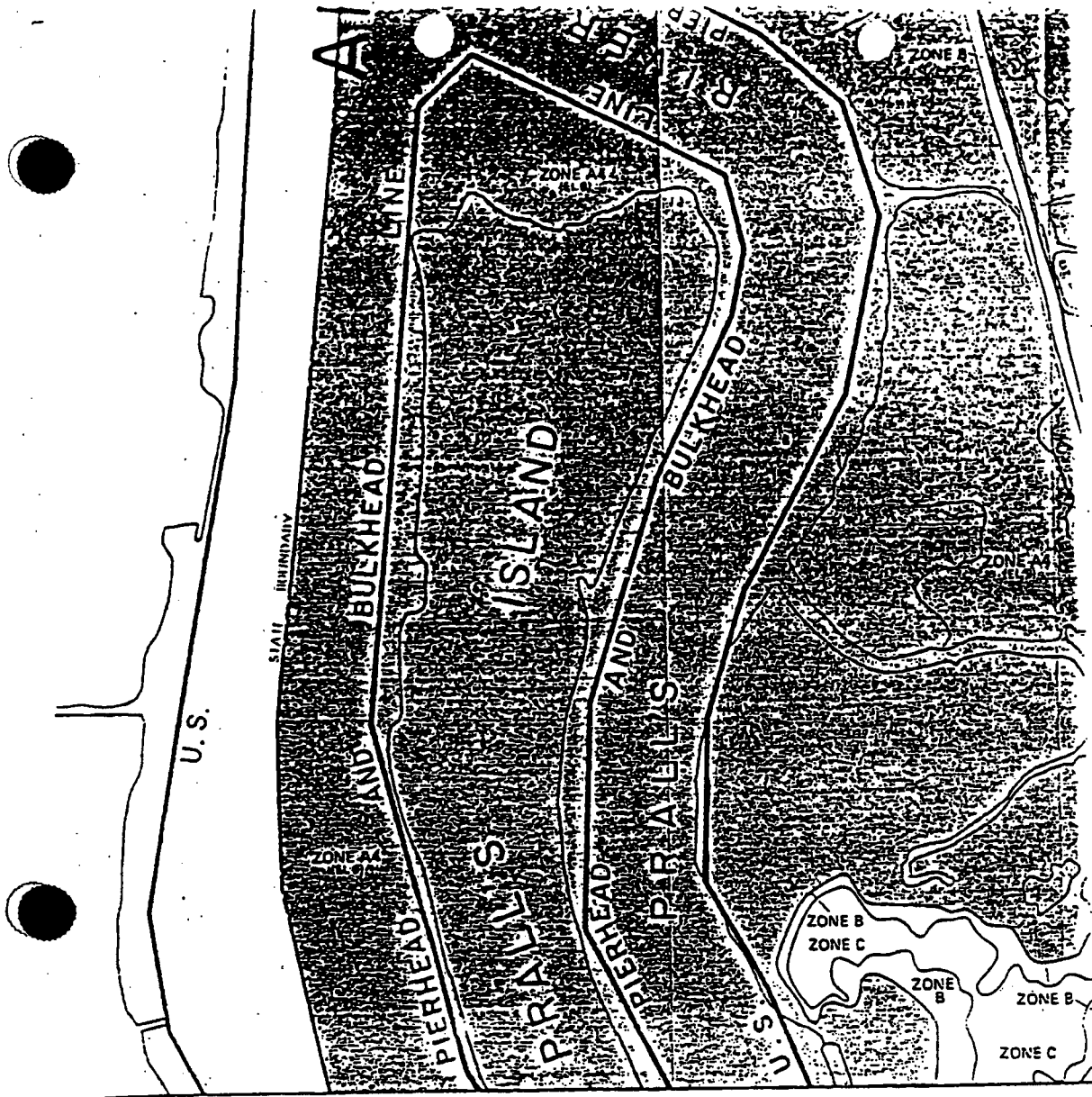


Federal Emergency Management Agency

NJDEP0000150



NJDEP0000151



NJDEP0000152

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CITY OF
NEW YORK,
NEW YORK
BRONX, RICHMOND,
NEW YORK, QUEENS
AND KINGS COUNTIES

PANEL 102 OF 131
SEE MAP INDEX FOR PANELS NOT PRINTED

COMMUNITY-PANEL NUMBER
360497 0102 B

EFFECTIVE DATE:
NOVEMBER 16, 1983



Federal Emergency Management Agency

NJDEP0000153

FLOOD INSURANCE STUDY



CITY OF ELIZABETH,
NEW JERSEY
UNION COUNTY



NOVEMBER 1, 1985



Federal Emergency Management Agency

COMMUNITY NUMBER - 345523

NJDEP0000155

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Exhibit 1 - Flood Profiles Elizabeth River	Panels 01P-02P
Exhibit 2 - Flood Boundary and Floodway Map	

PUBLISHED SEPARATELY:

Flood Insurance Rate Map

problems in the area in order to verify the results of the study. The New York District of the U. S. Army Corps of Engineers (COE) was contacted to obtain information from the flood control project for the Elizabeth River.

On April 24, 1985, the results of the study were reviewed at a final CCO meeting held with representatives of FEMA, the city, and the study contractor.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Elizabeth, Union County, New Jersey. The area of study is shown on the Vicinity Map (Figure 1).

Riverine flooding from the entire length of the Elizabeth River within the corporate limits was studied by detailed methods. Tidal flooding from Newark Bay and Arthur Kill was also studied by detailed methods. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through November 1989.

Several areas of interior drainage flooding along the Elizabeth River between the New Jersey Turnpike and Bridge Street were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the City of Elizabeth.

2.2 Community Description

The City of Elizabeth is located in the eastern portion of Union County in northeastern New Jersey. It is bordered by the City of Newark and the Townships of Hillside and Union to the north, the Boroughs of Roselle and Roselle Park to the west, the City of Linden to the south, and the Cities of Bayonne and New York to the east.

According to the U. S. Bureau of the Census, the population of Elizabeth was 106,200 in 1980 (Reference 1). As the county seat for Union County, the center of Elizabeth is characterized by office buildings and commercial development. Residential development extends from the central business district to the city limits. Industry is located mostly in the eastern half of the city.

FLOOD INSURANCE STUDY
CITY OF ELIZABETH, NEW JERSEY

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Elizabeth, Union County, New Jersey, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in their efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study represent a revision of the original analyses. The updated version was prepared by The RBA Group for the Federal Emergency Management Agency (FEMA), under Contract No. EMW-C-1195. This work was completed in November 1984.

1.3 Coordination

On April 12, 1983, flooding sources requiring mapping and profile revisions were identified at an initial Consultation and Coordination Officer's (CCO) meeting attended by representatives of FEMA, the City of Elizabeth, and The RBA Group (the study contractor). A legal notice was placed in The Daily Advance on October 12, 19, and 26, 1983, announcing the beginning of the study and stating its objectives.

City officials were contacted to gather technical data, existing flood damage reports, master plans, and other related flood information. City residents were also contacted to gain information pertinent to flood

The Elizabeth River flows southeast through the center of the city from the northwestern corporate limits to Arthur Kill, a tidal estuary. The river is bordered by residential, commercial, and industrial development, with a park located along the lower length.

The eastern portion of the city fronts on Newark Bay to the north and Arthur Kill to the south. The shoreline is characterized by industrial development and port activity as well as undeveloped marshes. Portions of Newark International Airport are located in the northern portion of Elizabeth.

The climate of the area is variable. Winters are characterized by cold, dry air masses which have their origin over sub-polar continental regions; summers are characterized by warm, humid air masses from subtropical regions, modified by their passage over land surfaces. During the spring and fall, maritime polar air masses become increasingly influential. The average annual rainfall is approximately 42.4 inches, and snowfall averages approximately 30 inches per year. The average annual temperature is approximately 53 degrees Fahrenheit (°F), with the lowest average temperature (31.4°F) in January and the highest average temperature (76.4°F) in July (Reference 2).

The topography of the region is characterized by gently sloping terrain from the inland areas to the tidal floods plains of Newark Bay. Within Elizabeth, the ground slopes from 50 feet in the center of the city to below 10 feet along the eastern shoreline.

2.3 Principal Flood Problems

In the past, Elizabeth has experienced flooding from riverine flows in the Elizabeth River and from tidal flooding along Newark Bay and Arthur Kill. The most severe floods to affect the area were tidal floods associated with hurricanes. The flood of record was a result of Hurricane Donna on September 12, 1960. During the flood, the water level at East Newark (applicable to Newark Bay) reached 8.4 feet at high tide, a level of 5.5 feet above the normal high tide. The maximum storm surge of record in the Hackensack estuary occurred on November 25, 1960, when the water-surface elevation increased 9 feet above low tide, reaching an elevation of 6.5 feet. If this surge had occurred at high tide, the resultant flood elevation would have reached 12 feet.

Areas along the Elizabeth River which show approximate 100-year flooding on the landward side of the levee between the New Jersey Turnpike and Bridge Street are not caused by overtopping of the levee. It is interior drainage areas which flood as a result of the levee system interior drainage system.

2.4 Flood Protection Measures

The COE is completing a flood control project along the Elizabeth River which consists of levees, channelization, and the reconstruction of bridges. The work is complete within the City of Elizabeth. FEMA specifies that all levees must have a minimum of three feet freeboard against 100-year flooding to be considered a safe flood protection structure. The levee system on the Elizabeth River does meet the FEMA freeboard requirement.

Residents and businesses within the city depend on warnings issued through radio, television, and local newspapers for information concerning possible flood conditions. Flood warnings and predicted flood peaks are issued by the Flood Forecasting Center of the National Oceanic and Atmospheric Administration, located at Trenton, New Jersey.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency and peak elevation-frequency relationships for flooding sources studied in detail affecting the community.

For the Elizabeth River, peak discharges were obtained from the COE Elizabeth River Flood Control Project (Reference 3). A summary of drainage area-peak discharge relationships for the Elizabeth River is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

<u>FLOODING SOURCE AND LOCATION</u>	<u>DRAINAGE AREA</u> (sq. miles)	<u>PEAK DISCHARGES (cfs)</u>			
		<u>10-YEAR</u>	<u>50-YEAR</u>	<u>100-YEAR</u>	<u>500-YEAR</u>
ELIZABETH RIVER					
At its confluence with Arthur Kill	22.90	3,271	5,444	6,273	8,043
At the upstream corporate limits	16.95	2,751	4,532	5,242	6,941

Water-surface elevations for Newark Bay were obtained from the Flood Insurance Studies for the Cities of New York and Bayonne (References 4 and 5). In those studies, tidal frequency relationships for Newark Bay were determined by analyzing the tidal gage records and historic high-water mark data for the bay. Tide gages are maintained at East Newark on the Passaic River by the U. S. Geological Survey (USGS) for tide data applicable to Newark Bay, and at the Battery (period of record since 1921) for Upper New York Bay.

A total of 563 northeasters occurring between 1926 and 1976 were analyzed and their peak storm surge elevations obtained and ranked by a disaggregation program for East Newark and the Battery. The highest storm tide recorded during this period was that of Hurricane Donna on September 12, 1960, with an elevation of 8.4 feet.

A correlation was established between maximum water-surface elevations at the Battery and at East Newark (Reference 6). This correlation may be used to transpose storm tides from the Battery to East Newark using the following equation:

$$H_{en} = 1.06 H_{fh}$$

where H_{en} is the maximum storm tide at East Newark, and H_{fh} is the maximum storm tide at the Battery.

Water-surface elevations for Arthur Kill were obtained from the Flood Insurance Study for the City of New York (Reference 4).

A summary of the peak elevation-frequency relationships for Newark Bay and Arthur Kill is shown in Table 2, "Summary of Stillwater Elevations."

TABLE 2 - SUMMARY OF STILLWATER ELEVATIONS

<u>FLOODING SOURCE AND LOCATION</u>	<u>ELEVATION (feet)</u>			
	<u>10-YEAR</u>	<u>50-YEAR</u>	<u>100-YEAR</u>	<u>500-YEAR</u>
NEWARK BAY				
0.5 mile downstream of the Newark Bay Bridge	7.1	8.8	9.5	10.6
At the confluence with Kill Van Kull and Arthur Kill	6.4	7.9	8.3	9.7
ARTHUR KILL				
At the confluence of the Elizabeth River	6.5	7.8	8.3	10.0
Approximately 4 miles south of Goethals Bridge	6.5	8.0	8.6	10.4

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the riverine source studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analyses of the Elizabeth River were field surveyed. All bridges and culverts were field surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1).

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 7). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the Elizabeth River were determined assuming coincident peak flows at its confluence with Arthur Kill.

Roughness coefficients (Manning's "n") were determined on the basis of field examination of the stream channel and overbank areas. The channel "n" values for the Elizabeth River ranged from 0.014 to 0.035, and the overbank "n" value was 0.060.

Consideration was given to the vulnerability of the shoreline of Elizabeth to wave action during severe hurricanes and northeasters. However, the effects of wave action were found to be minimal.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year flood plain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps (Reference 8).

For the areas studied by approximate methods, the boundary of the 100-year flood was delineated using maps from the COE Elizabeth River Flood Control Project (Reference 3). The approximate flood boundary was delineated around detention ponds at an elevation equivalent to the 100-year flood on the Elizabeth River.

The 100- and 500-year flood plain boundaries are shown on the Flood Boundary and Floodway Map (Exhibit 2). In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

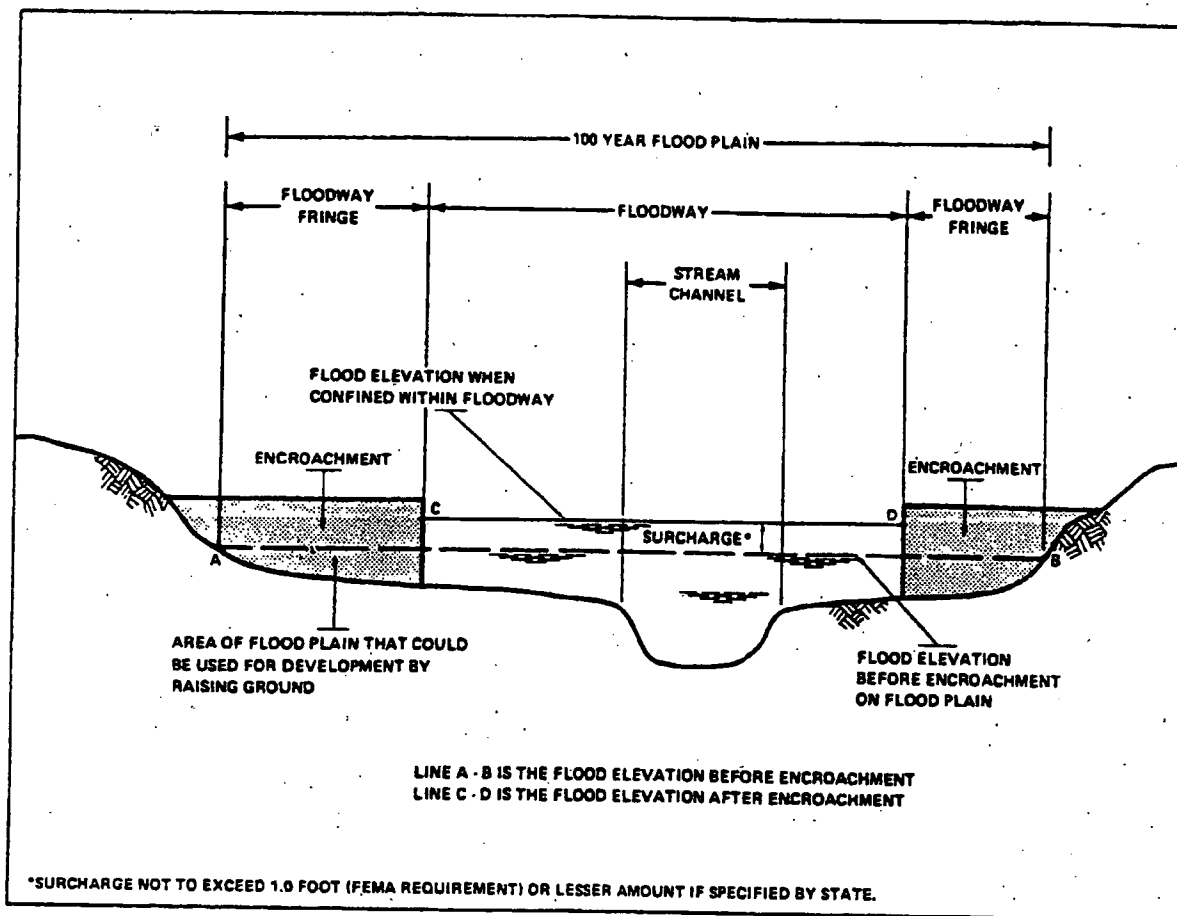
4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood plain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. However, the State of New Jersey has established criteria limiting the increase in flood heights to 0.2 foot. Thus, a floodway having no more than a 0.2-foot surcharge has been delineated for this study. The floodway in this study is presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

Since the 100-year flood is always contained either within the Elizabeth River levee or within the channelization, the floodway presented in this study is shown on the land side toe of the levee when along the levee, and along the channel bank where the 100-year flood is contained within the channel. This is to insure that no development will occur on the levee, on the river side of the levee, or within the channel. Since the floodway along the Elizabeth River was defined by regulatory constraints and not by encroachment, there are no surcharges, and no cross sections are shown on the Flood Boundary and Floodway Map or on the Flood Profiles.

In cases where the floodway and 100-year flood plain boundaries are either close together or collinear, only the floodway boundary has been shown on the Flood Boundary and Floodway Map (Exhibit 2).

The area between the floodway and 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 0.2 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.



FLOODWAY SCHEMATIC

Figure 2

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail in the City of Elizabeth.

5.1 Reach Determinations

Reaches are defined as sections of flood plain that have relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following tabulation for more than 20 percent of the reach:

Average Difference Between
10- and 100-Year Floods

Variation

Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The location of the reach determined for the riverine flooding source of the City of Elizabeth is shown on the Flood Profiles (Exhibit 1) and summarized in Table 3.

In tidal areas, reaches are limited to the distance for which the 100-year flood elevation does not vary more than 1.0 foot. Using these criteria, three reaches were required for the tidal flooding sources of the City of Elizabeth. The locations of these reaches are shown on the Flood Insurance Rate Map and summarized in Table 3.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one-half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.

FLOODING SOURCE	PANEL ¹	ELEVATION DIFFERENCE ² BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION ³ (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Elizabeth River Reach 1	05	-2.3	-0.6	+1.7	025	A5	Varies
Newark Bay Reach 1	05	-1.9	-0.6	+1.4	020	A4	8
Reach 2	05	-2.3	-0.7	+1.2	025	A5	Varies
Arthur Kill Reach 1	05	-2.0	-0.6	+1.6	020	A4	Varies

¹Flood Insurance Rate Map Panel

²Weighted Average

³Rounded to the nearest foot - see map

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ELIZABETH, NJ
(UNION CO.)

FLOOD INSURANCE ZONE DATA

ELIZABETH RIVER - NEWARK BAY - ARTHUR KILL

TABLE 3

NJDEP0000168

Zones A4 and A5: Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHF's.

Zone B: Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding; not subdivided.

Flood elevation differences, FHF's, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Table 3.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Elizabeth is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

Flood Insurance Studies for the Cities of New York, Bayonne, Newark, and Linden, the Townships of Hillside and Union, and the Boroughs of Roselle and Roselle Park have been completed (References 4, 5, 9, 10, 11, 12, 13, and 14). Data from the New York City study were used in this study for tidal flood elevations. These data were based on a longer period of record and the most up-to-date detailed tidal analysis of the Newark Bay-New York Harbor area. These data agree with information published in the Bayonne study but supersede data from the Linden and Newark studies.

Data from the COE Elizabeth River Flood Control Project were used for flood elevations for the Elizabeth River (Reference 3). These data take into account the newly constructed levees and supersede data from the Hillside and Union studies. This study is in exact agreement with the Roselle and Roselle Park studies.

7.0 LOCATION OF DATA

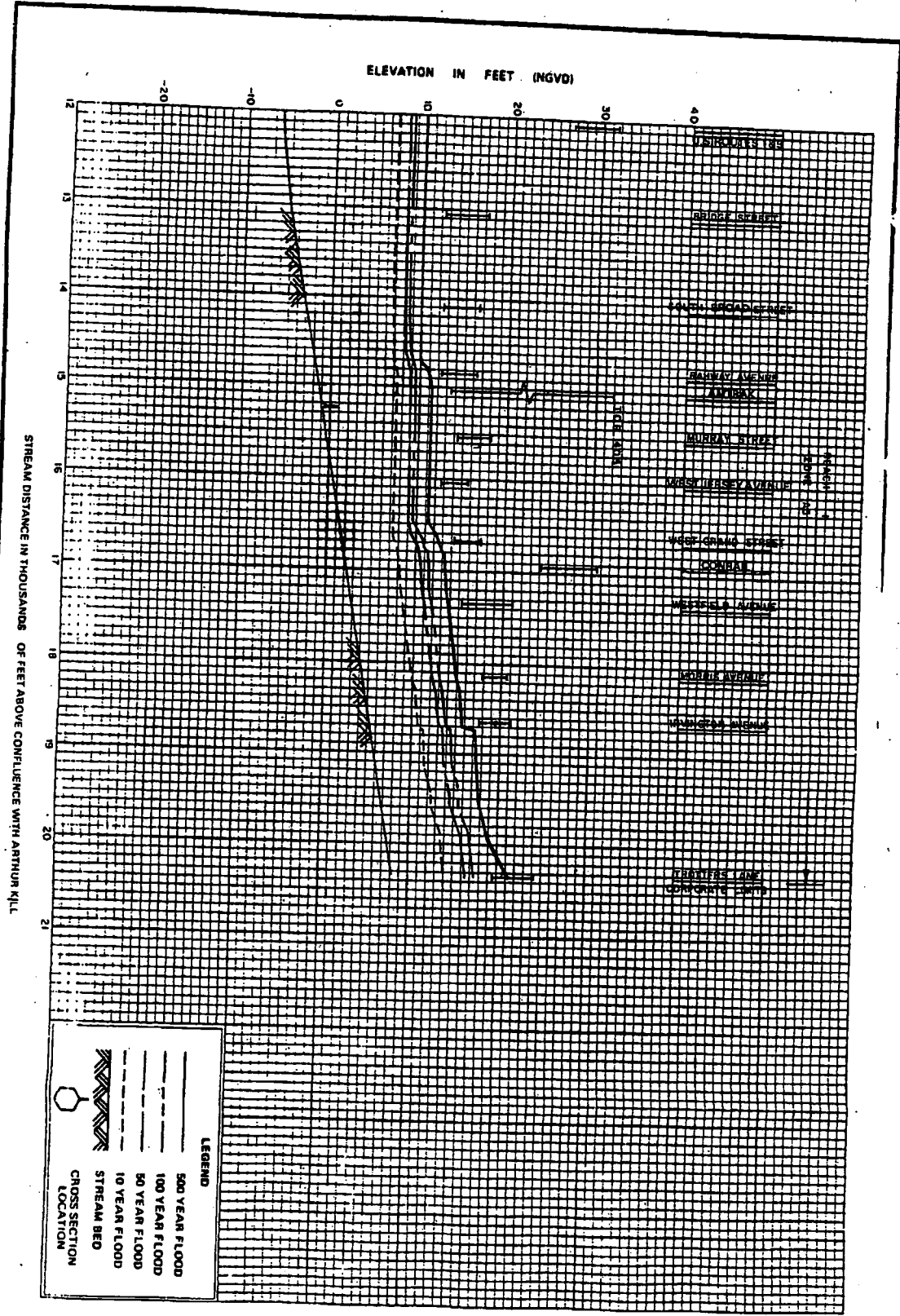
Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, Regional Director, Region II Office, 26 Federal Plaza, Room 19-100, New York, New York 10278.

8.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, New Jersey, Washington, D. C., U. S. Government Printing Office, 1981.
2. Malcolm Pirnie, Inc., prepared for the Hudson County Utilities Authority, 201 Wastewater Facilities Plan, Planning Area II, Volume I, Regional Inventory, Hudson County, New Jersey, January 1979.
3. U. S. Army Corps of Engineers, New York District, Elizabeth River Flood Control Project, New York, July 1981.
4. Federal Emergency Management Agency, Flood Insurance Study, City of New York, New York, Bronx, Queens, Kings, and Richmond Counties, Washington, D. C., May 16, 1983.
5. Federal Emergency Management Agency, Flood Insurance Study, City of Bayonne, Hudson County, New Jersey, Washington, D. C., February 15, 1983.
6. Tippetts-Abbett-McCarthy-Stratton, Frequency Distribution for Hurricane and Northeaster Tides at Upper Newark Bay, New York, January 1980.
7. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, November 1976.
8. Topographic Data Consultants of Berlin, New Jersey, Topographic Maps compiled from aerial photographs, Scale 1:4,800, Contour Interval 4 Feet: City of Elizabeth, Union County, New Jersey, December 1983.
9. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, City of Newark, Essex County, New Jersey, Washington, D. C., September 28, 1979.
10. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Linden, Union County, New Jersey, Washington, D. C., May 24, 1976.

11. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Township of Hillside, Union County, New Jersey, Washington, D. C., March 14, 1979.
 12. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Township of Union, Union County, New Jersey, Washington, D. C., February 1, 1978.
 13. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Borough of Roselle, Union County, New Jersey, Washington, D. C., January 17, 1978.
 14. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Borough of Roselle Park, Union County, New Jersey, Washington, D. C., December 4, 1979.
- Malcolm Pirnie, Inc., prepared for the Hudson County Utilities Authority, 201 Wastewater Facilities Plan, Planning Area II, Volume 5, Combined Sewer Overflow Study, Hudson County, New Jersey, May 1979.

21



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ELIZABETH, NJ
(UNION CO.)

FLOOD PROFILES

NJDEP0000173

ELIZABETH RIVER

02P

BLANK DIVDER

GAF CHEMICALS CORPORATION
1361 Alps Road Wayne NJ 07470-3688

file # ?
55- 1.06.05.06

201 628 3000

A Subsidiary of
GAF CORPORATION



March 15, 1990

Mr. Roman S. Luzacky, Case Manager
Bureau of Federal Case Management
Division of Hazardous Waste Management
New Jersey Department of Environmental Protection
CNO28
Trenton, NJ 08625-0028

Dear Mr. Luzacky:

This is to confirm our conversation of March 15, in which I informed you, as required by the June 19, 1989 Administrative Consent Order, that GAF will begin the drilling of monitoring wells at the Linden site during the week of March 26, 1990. You and/or your staff are cordially invited to observe drilling and sampling operations when they occur.

Please provide GAF information on what document the NUDEP will use to review the RI laboratory data. Specifically is the Statement of Work (SOW) dated 2/88 for organics and 7/88 for inorganic acceptable?

Thank you again for your interest in this matter.

Very truly yours,

Neil A. Kaye

N. A. Kaye
Manager, Waste Abatement

NAK0202/rb

bcc: S. MacMillin
A. J. ten Braak

BLANK DIVDER

A Subsidiary of
GAF CORPORATION

GAF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

June 13, 1991

Mr. Joseph Freudenberg
New Jersey Department of Environmental Protection
Division of Hazardous Waste Management
Bureau of Federal Case Management
401 East State Street
CN 028
Trenton, New Jersey 08625-0028

RE: GAF Chemicals Corporation, Linden N.J.
Decontamination/Decommissioning Plan

Dear Mr. Freudenberg:

A draft Decontamination/Decommissioning Plan for GAF's Linden Facility was submitted to the Department on March 7, 1991. The activities contained in this plan fall into four distinct phases;

- I. Chemical Decontamination,
- II. Building Decommissioning,
- III. Building Maintenance,
- IV. Building Demolition

- I. Chemical Decontamination includes cleaning of all manufacturing equipment, sample collection and analysis to verify cleanliness, and removal of all debris and flammable materials. Since manufacturing was discontinued on April 1, 1991, not only have all chemical and waste materials been removed from the site, but over two hundred and thirty (230) pieces of production equipment have been chemically decontaminated. Seven buildings have had all debris and flammable material removed in preparation for the Decommissioning phase. Two of these buildings have been inspected, received approval from the Linden Fire Department, and the process of disconnecting utilities and fire protection sprinklers has begun.

With a substantial amount of work being completed at our own risk, it is anticipated that the Chemical Decontamination activities, being conducted according to the Draft D/D Plan, will be completed within the next three months. In order to avoid redoing much of this work, your comments on the draft D/D plan are appreciated as soon as possible.

An equal opportunity employer

24 PM *ENV AFF 201-628-3583 P02

Mr. Joseph Freudenberg
June 13, 1991
Page 2

- II. Building Decommissioning would begin once the Chemical Decontamination is complete. Decommissioning activities consist of:

1. Disconnecting all utilities,
2. Removal of friable asbestos,
3. Removal of loose debris,
4. Securing the buildings against unauthorized entry.

It is estimated that Building Decommissioning would be completed within approximately eight months. Based on the above time estimate, this activity is planned to start by the end of August or early September unless major modifications to the D/D Plan are required by the Department.

- III. Once Building Decommissioning is completed, by about April 1992, each structure will be subject to the Periodic Maintenance program. This program will consist of a detailed building inspection to assure continued integrity of intact Asbestos Containing Material. Inspections will be documented, and any deteriorated ACM repaired or removed promptly to maintain a non-friable condition.

- IV. Building Demolition will consist of:

1. Equipment Salvage,
2. Intact Asbestos Removal,
3. Powerwashing of building interiors, and
4. Building Demolition with resource recovery and reuse.

All structures at the facility would undergo demolition with the exception of Waste Water Treatment Structures, the Warehouse (#120) Building and the Administration (#100) Building.

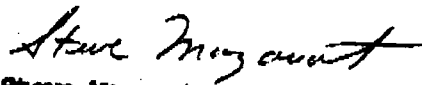
The above plan delineates activities contained in the Draft Decontamination/Decommissioning Plan. A more detailed schedule for the Demolition Plan will be developed, after Phases I, II and III are finalized. At this time, it is not certain what the timing of the Demolition Plan will be since we do not know what the timing of our incinerator project will be. We would like to keep you advised as we get closer to that time.

Mr. Joseph Freudenberg
June 13, 1991
Page 3

We have attached a copy of the proposal from Peterson & Staeger Inc., who will conduct the asbestos removal and the maintenance inspections of the facilities as described above.

Please call if there are any additional questions.

Sincerely,



Steve Mazouat
Linden Site Operations Manager

SM001/hbg
Attach.

cc: A. Charles, NJDEP
R. Luzecky, "
A. tenBraak, GAF
N. Kaya, "
P. Vatter, "

01:24 PM *ENV AFF 201-628-3583 P04



Peterson & Staeger, Inc.

COMMERCIAL & INDUSTRIAL CONTRACTORS

P.O. BOX 228

156 WEST FRONT ST.

KEYPORT, NJ 07735
(908) 264-7983

June 3, 1991

GAF Chemical Corp.
1361 Alps Road
Wayne, NJ 07470

Attn: Mr. John O'Keefe

Re: GAF Linden, New Jersey

Dear Mr. O'Keefe:

Peterson & Staeger Inc. and subcontractor Hesco Inc. will provide all labor, materials, equipment and insurance to perform the following at the above-referenced site.

I. Clean-Up Plan:

a) Asbestos Abatement:

Peterson & Staeger will patch all damaged areas with Childers SO-06 cement and rewettable lagging cloth. Vacuum areas where ACM has fallen. 6 mill poly will be utilized to seal pipe ends and damaged areas. Removal of ACM in areas beyond repair. Areas to be designated by GAF and Hesco Personnel.

II. P&S Will Provide A Project Schedule:

- b) Health and Safety Plan
- c) Progress Report
- d) Waste Hauling
- e) O.S.H.A. Personal Air Monitoring
- f) Supply Lighting and Power
- g) Designated Building 12, 36, 46, 47, 48, 29, 41, 100, 101, 52, 200, 204, 207, 300, and Pipe Racks.
- h) Notifications by Peterson & Staeger & Hesco:
U.S.E.P.A. - Asbestos Abatement Projects Rule 40 CFR 762
U.S.E.P.A. - Regulation for Asbestos 40 CFR Subpart A
N.J. Asbestos Control and Licensing Act NJSA 54:5A
N.J.D.O.H. and N.J.D.O.L.
N.J.D.E.P.

Continued.../

Page 2
GAP
June 3, 1991

P&S and Hesco workers on the project are Hazmat trained and possess New Jersey Department of Labor Asbestos Handling and Supervisor Permits.

- k) Insurance five million true occurrence with no sunset Clause. Final Report.

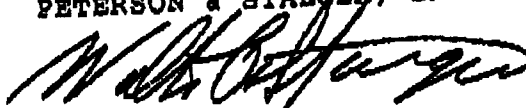
For the Lump Sum of \$228,000.00

Our price does not include NJ Sales Tax, if applicable.

Addendum: A two year Maintenance Program will follow this Quote and cost of same.

Very truly yours,

PETERSON & STAEGER, INC.


Walter O. Staeger
President

WOS/ss

01:24 PM *ENV AFF 201-628-3583 P06

Mr. Joseph Freudenberg
June 13, 1991
Page 2

II. Building Decommissioning would begin once the Chemical Decontamination is complete. Decommissioning activities consist of:

1. Disconnecting all utilities,
2. Removal of friable asbestos,
3. Removal of loose debris,
4. Securing the buildings against unauthorized entry.

It is estimated that Building Decommissioning would be completed within approximately eight months. Based on the above time estimate, this activity is planned to start by the end of August or early September unless major modifications to the D/D Plan are required by the Department.

III. Once Building Decommissioning is completed, by about April 1992, each structure will be subject to the Periodic Maintenance program. This program will consist of a detailed building inspection to assure continued integrity of intact Asbestos Containing Material. Inspections will be documented, and any deteriorated ACM repaired or removed promptly to maintain a non-friable condition.

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All structures at the facility would undergo demolition with the exception of Waste Water Treatment Structures, the Warehouse (#120) Building and the Administration (#100) Building.

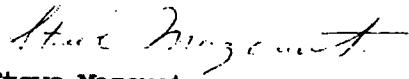
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Mr. Joseph Freudenberg
June 13, 1991
Page 3

We have attached a copy of the proposal from Peterson & Staeger Inc., who will conduct the asbestos removal and the maintenance inspections of the facilities as described above.

Please call if there are any additional questions.

Sincerely,



Steve Mazouat
Linden Site Operations Manager

SM001/hbg
Attach.

cc: A. Charles, NUDEP
R. Luzecky, "
A. tenBraak, GAF
N. Kaye, "
P. Vetter, "

BLANK DIVDER



Peterson & Staeger, Inc.

COMMERCIAL & INDUSTRIAL CONTRACTORS

P.O. BOX 228

156 WEST FRONT ST.

KEYPORT, NJ 07735
(908) 264-7983

June 3, 1991

GAF Chemical Corp.
1361 Alps Road
Wayne, NJ 07470

Attn: Mr. John O'Keefe

Re: GAF Linden, New Jersey

Dear Mr. O'Keefe:

Peterson & Staeger Inc. and subcontractor Hesco Inc. will provide all labor, materials, equipment and insurance to perform the following at the above-referenced site.

I. Clean-Up Plan:

a) Asbestos Abatement:

Peterson & Staeger will patch all damaged areas with Childers SO-06 cement and rewettable lagging cloth. Vacuum areas where ACM has fallen. 6 mill poly will be utilized to seal pipe ends and damaged areas. Removal of ACM in areas beyond repair. Areas to be designated by GAF and Hesco Personnel.

II. P&S Will Provide A Project Schedule:

- b) Health and Safety Plan
- c) Progress Report
- d) Waste Hauling
- e) O.S.H.A. Personal Air Monitoring
- f) Supply Lighting and Power
- g) Designated Building 12, 36, 46, 47, 48, 29, 41, 100, 101, 52, 200, 204, 207, 300, and Pipe Racks.
- h) Notifications by Peterson & Staeger & Hesco:
 - U.S.E.P.A. - Asbestos Abatement Projects Rule 40 CFR 762
 - U.S.E.P.A. - Regulation for Asbestos 40 CFR Subpart A
 - N.J. Asbestos Control and Licensing Act NJSA S4:5A
 - N.J.D.O.H. and N.J.D.O.L.
 - N.J.D.E.P.

Continued.../

Page 2
GAF
June 3, 1991

P&S and Hesco workers on the project are Hazmat trained and possess New Jersey Department of Labor Asbestos Handling and Supervisor Permits.

k) Insurance five million true occurrence with no sunset Clause. Final Report.

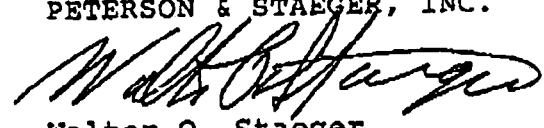
For the Lump Sum of \$228,000.00

Our price does not include NJ Sales Tax, if applicable.

Addendum: A two year Maitainance Program will follow this Quote and cost of same.

Very truly yours,

PETERSON & STAEGER, INC.



Walter O. Staeger
President

WOS/ss

LINDEN DECONTAMINATION/DECOMMISSIONING

APPARATUS LAYOUTS

BUILDING	FLOOR	DRAWING NO.
13	1st, West	D-6479
13	1st, East	D-6479 A
13	2nd, West	D-6604
13	2nd, East	D-6604 A
13	Fan Flr & Mezzanine	D-7928
29	--	D-8530
36E	1st	D-3046
36E	2nd	D-3047 A
36E	3rd	D-3047 B
36W	1st	D-8415
36W	2nd	D-8416
36W	3rd & 3rd Mezzanine	D-8417
36W	4th	D-8418
36W	4th Mezzanine	H-4249-3
36W	Roof	D-8423
41		
46	1st	D-7514
46	2nd	D-7515
46	3rd	D-7516
46	4th	D-7517
47	1st	D-3182
47	2nd & 3rd	D-7329
48	1st	D-6808
48	2nd	D-6809
48	3rd	D-6810
48	4th	D-6956
48	5th Flr & Roof	D-7483
52	1st, West	H-4441
52	2nd, West	H-4442

BUILDING	FLOOR	DRAWING NO.
52	3rd, West	D-8804
53	1st	D-6193
53	2nd	D-9710
53	3rd & Mezzanine	D-5824
53	4th	D-5825
53	4th Mezzanine	D-6037
53	5th	D-5826
100	1st	D-7030
100	2nd	D-7031
100	Roof	D-5976
101	1st	D-9624
101	2nd	D-9625
110	--	D-8550
120	Arch. Plan	H-1532
120	West Office Area	H-2189
120	East Office Area	H-1957
200	1st	D-7120
200	2nd	D-7091
200	3rd	D-7092
200	4th	D-7093
204	1st	D-8161
204	2nd	D-8162
204	Roof	H-3086
207	--	H-5500
300	--	EFD-904
306	--	EFE-205
410	1st	H-6182
410	2nd	H-6183
Main Yard	--	D-4040 A
West Yard	--	D-4040 B

LINDEN DECONTAMINATION/DECOMMISSIONING

APPARATUS LAYOUTS

BUILDING	FLOOR	DRAWING NO.
13	1st, West	D-6479
13	1st, East	D-6479 A
13	2nd, West	D-6604
13	2nd, East	D-6604 A
13	Fan Flr & Mezzanine	D-7928
29	--	D-8530
36E	1st	D-3046
36E	2nd	D-3047 A
36E	3rd	D-3047 B
36W	1st	D-8415
36W	2nd	D-8416
36W	3rd & 3rd Mezzanine	D-8417
36W	4th	D-8418
36W	4th Mezzanine	H-4249-3
36W	Roof	D-8423
41		
46	1st	D-7514
46	2nd	D-7515
46	3rd	D-7516
46	4th	D-7517
47	1st	D-3182
47	2nd & 3rd	D-7329
48	1st	D-6808
48	2nd	D-6809
48	3rd	D-6810
48	4th	D-6956
48	5th Flr & Roof	D-7483
52	1st, West	H-4441
52	2nd, West	H-4442

BUILDING	FLOOR	DRAWING NO.
52	3rd, West	D-8804
53	1st	D-6193
53	2nd	D-9710
53	3rd & Mezzanine	D-5824
53	4th	D-5825
53	4th Mezzanine	D-6037
53	5th	D-5826
100	1st	D-7030
100	2nd	D-7031
100	Roof	D-5976
101	1st	D-9624
101	2nd	D-9625
110	--	D-8550
120	Arch. Plan	H-1532
120	West Office Area	H-2189
120	East Office Area	H-1957
200	1st	D-7120
200	2nd	D-7091
200	3rd	D-7092
200	4th	D-7093
204	1st	D-8161
204	2nd	D-8162
204	Roof	H-3086
207	--	H-5500
300	--	EFD-904
306	--	EFE-205
410	1st	H-6182
410	2nd	H-6183
Main Yard	--	D-4040 A
West Yard	--	D-4040 B

BLANK DIVDER

GAF CHEMICALS CORPORATION
1361 Alps Road Wayne NJ 07470-3688

201 628 3000

A Subsidiary of
CORPORATION

GAF

June 4, 1991

FEDERAL BUREAU OF
CASE MANAGEMENT
JUN 10 1991

Mr. Joseph Freudenberg
Case Manager
Bureau of Federal Case Management
New Jersey Department of
Environmental Protection
Division of Hazardous Waste Management
CN028, 401 East State Street
Trenton, New Jersey, 08625-0028

Dear Mr. Freudenberg:

As discussed by telephone, we have received a request from our consultant, Eckenfelder Inc., for more time to finalize the risk assessment portion of the remedial investigation of our Linden, New Jersey site as required by the Administrative Consent Order for the site.

It is our understanding that the preparation of the Risk Assessment by Eckenfelder could not be significantly initiated until the RI report was nearly complete. This was due to the fact that the Risk Assessment derives all of its data and assumptions regarding the data directly from the RI. However, in the interest of expediting the initial stages of the Risk Assessment, some work was conducted concurrently with the RI. This Risk Assessment work included the preparation of data summaries which were used to calculate intake estimates for the various exposure routes.

As you know, a significant setback was experienced by Eckenfelder in the preparation of the RI and the Risk Assessment due to a systematic computer data omission on the part of the analytical laboratory, as described in a letter to yourself from our Mr. Neil Kaye dated March 28, 1991. This computer problem had the effect of invalidating much of the RI interpretation and all of the Risk Assessment work that had been conducted to date. This, in turn, delayed Eckenfelder's internal schedule for the completion of the RI by nearly three months. Even with this delay it was still possible for the RI report to be completed by the May 14, 1991 deadline. However, the one month extension, to June 15, 1991, for the completion of the Risk Assessment has proved to be inadequate.

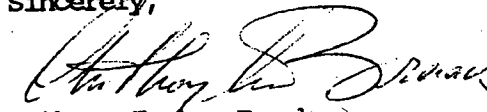
Mr. Joseph Freudentberg
June 4, 1991
Page 2

We regret that this has occurred but wish to emphasize that the delay in the finalization in the risk assessment will not have an impact on the overall timing and preparation of the feasibility study. The work plan proposal is at present in preparation.

According to our consultant, a partial submission of the risk assessment will be made on or before June 15. Please note Eckenfelder's letter to my attention dated 5/31/91 (copy attached).

We would appreciate an additional extension for the remainder and completion of the risk assessment until July 19, 1991. This request is made in accordance with paragraph 61 of the ACO.

Sincerely,



Anthony J. ten Braak
General Manager
Environmental Services Business

AJTBO692/hbg
Attach.

cc: Roman Luzecky

BLANK DIVDER

Exhibit D

BLANK DIVDER

AND ASSUMPTION

INSTRUMENT OF ASSIGNMENT AND ASSUMPTION, dated as of April 10, 1989, by and among GAF Corporation (the "Corporation") and Dorset Inc. ("Dorset"), both Delaware corporations (the "Instrument").

WHEREAS, the holders of all the outstanding shares of capital stock of the Corporation entitled to vote thereon have adopted and approved a Plan of Complete Liquidation of the Corporation (the "Plan");

WHEREAS, Dorset owns 87.43655% of the capital stock of the Corporation;

WHEREAS, pursuant to the Plan, the Board of Directors of the Corporation has determined to effect the distribution and transfer of all of its assets and liabilities to all of its stockholders;

WHEREAS, pursuant to the Plan, the Corporation has filed a Certificate of Dissolution in the state of Delaware;

NOW, THEREFORE, in consideration of the premises and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto take the following actions:

1. The Corporation hereby transfers, conveys, sets over and assigns to Dorset:

(1) all the assets and liabilities, known and unknown, relating to its acetylenic chemicals, surfactants, specialty chemicals, organometalics, mineral products, industrial filters and filter vessels businesses (collectively, the "Chemicals Businesses"), including but not limited to: (A) all the outstanding stock of GAF Chemicals Corp., General Aniline and Film Corp., GAF Realty Corporation, GAF International Corporation, Ludlow Inc., Bluehall Inc., Mossbank Inc., Alkaril Chemicals Ltd. (Canada), GAF (Australasia) Pty. Ltd., GAF (Belgium) N.V., GAF do Brasil Industria e Comercio Ltda, GAF (Canada) Inc., GAF (Deutschland) GmbH, GAF (France) S.A., GAF Freight Services N.V. (Belgium), GAF (Great Britain) Co. Ltd., GAF (Hong Kong) Limited, GAF Insurance Ltd. (Bermuda), GAF (Italia) S.r.l., GAF (Japan) Ltd., GAF Corporation de Mexico, S.A. de C.V., GAF (Norden) A.B., GAF (Osterreich) Ges.m.b.H., GAF Sales (U.K.) Limited, GAF (Singapore) Pte. Ltd., GAF (Switzerland) A.G., GAF (U.S. Virgin Islands), Inc., and all the shares of GAF-Huls Chemie GmbH held by the Corporation; (B) all right, title and interest of the Corporation in and to all the technologies and trademarks and tradenames used by the Corporation relating to the Chemicals Businesses, including, but not limited to the patents and trademarks listed in Exhibit A attached hereto; (C) all the Corporation's real property interests listed in Exhibit B attached hereto;

(ii) notwithstanding any other provision of this Instrument, all its trademarks or tradenames that contain the name "GAF", including, but not limited to those contained in Exhibit C attached hereto (to the extent owned by the Corporation); and

(iii) all of its assets, known or unknown, not otherwise transferred, conveyed, set over, or assigned or assumed under this Instrument or under Instruments of Assignment and Assumption of even date herewith between the Corporation and one or all of its stockholders (collectively, the "Other Instruments"), including, but not limited to, any land, leases, buildings, real property, plant, equipment, inventory, contract rights, receivables, trademarks, intangibles, discontinued products and other assets.

2. Dorset hereby undertakes, assumes and agrees to perform, pay or discharge all of the duties, obligations and liabilities of the Corporation with respect to (and to defend, indemnify and hold harmless the Corporation from and against all losses, liabilities and expenses, including legal fees and court costs, suffered or incurred in connection with) the assets and liabilities transferred, conveyed, set over or assigned to it under paragraph 1 above.

3. Notwithstanding any other provision of this Instrument, Dorset shall not assume and shall not be liable for

any liabilities, costs, fees and expenses, known or unknown, arising out of any claims, lawsuits or other actions (A) seeking recovery for bodily injury, sickness, disease or death alleged to have been caused in whole or in part by any asbestos or asbestos-containing material whether in the work place or otherwise, (B) seeking to recover the cost of abatement, removal or replacement of asbestos or asbestos-containing material from any public, commercial or private building or other structure, including the cost of health screenings, inspections and operation and maintenance programs, (C) seeking the clean-up of asbestos or asbestos-containing material from any land fill, waste disposal or other sites, and (D) any other liability related to the manufacture, sale or use of asbestos or asbestos-containing material, whether arising pursuant to a contractual agreement or under Federal, state or local law, ordinance, regulation, rule or common law (in contract, tort or otherwise) (collectively, the "Asbestos-Related Liabilities").

4. The Corporation hereby transfers, conveys, sets over and assigns to Dorset:

(i) 100% of the liabilities arising out of (A) the production of Amiben; (B) Project Aware environmental clean-up costs; and (C) environmental claims arising out of plants currently operating in the Chemicals Businesses (collectively, the "Specific Liabilities"); and

(ii) 87.43655% of its duties, obligations and liabilities, not otherwise transferred, conveyed, set over, or assigned or assumed under this instrument or under the Other Instruments (all such duties, obligations and liabilities collectively the "Other Liabilities"), including, but not limited to, its liabilities (A) under the note issued by the Corporation to G-I Holdings Inc. on March 29, 1989 with a principal amount of \$5,170,300, (B) for workers compensation and medical benefits for retirees and former employees of discontinued operations, (C) for insurance claims arising with respect to the 1983-84 year during which the Corporation was self-insured, (D) for pension plan termination liabilities, (E) for the redemption of the Preferred Stock of the Corporation, and (F) for other legal claims, but excluding all Asbestos-Related Liabilities.

Dorset hereby undertakes, assumes and agrees to perform, pay or discharge all the duties, obligations and liabilities of the Corporation with respect to (and to defend, indemnify and hold harmless severally the Corporation from and against all losses, liabilities and expenses, including legal fees and court costs, suffered or incurred in connection with) 100% of the Specific Liabilities and 87.43655% of the Other Liabilities.

5. Dorset shall enjoy, to the fullest extent permitted under applicable law, the benefit of all insurance coverage of the Corporation in effect on the date of the adoption of the Plan.

6. The parties hereto hereby agree to execute and deliver such further instruments and documents as any party shall reasonably request to effect the foregoing transactions.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed the day and year first above written.

GAF Corporation

By _____

Dorset Inc.

By _____

BLANK DIVDER



**RIKER
DANZIG
SCHERER
HYLAND
PERRETTI LLP**

ATTORNEYS AT LAW

Dennis J. O'Grady

Direct:
t: 973.451.8485
f: 973.451.8701
dogrady@riker.com
Reply to: Morristown

**Fed. R. Evidence 408(a)
For Settlement Purposes Only**

April 2, 2009

Via E-Mail

Gordon, David L. (ENRD) [David.L.Gordon@usdoj.gov]

David L. Gordon, Esq.
Trial Attorney
Environmental and Natural Resources Division
United States Department of Justice
601 D Street, NW
Washington, DC 20004

Re: In re: G-I Holdings Inc., et al.

Dear David:

In furtherance of our ongoing settlement discussions, I enclose a memorandum which establishes that IES is the appropriate corporate successor to Old GAF's environmental liability at the Linden Sites.

In addition, I am enclosing the following information:

1. IES Corporate Tree;
2. Chart listing IES Insurance Receivables but, because of confidentiality agreements, the Chart does not include the identity of the insurers;
3. A narrative of the ongoing litigation involving the Linden Site.

Please note that these materials are being furnished pursuant to Fed. R. Evidence 408(a) and the Confidentiality Order previously entered in the above-captioned case.

David L. Gordon, Esq.
April 2, 2009
Page 2

Please let me know when we can finalize this aspect of the global settlement of the Government's Claims in G-I's bankruptcy case.

Very truly yours,

Dennis J. O'Grady

DJOG/bt
Enclosures

3939695.1

"Highly Confidential"

**FED. R. EVIDENCE 408(a)
FOR SETTLEMENT PURPOSES ONLY**

Corporate History Summary Regarding the Linden Sites

Introduction

This confidential summary has been prepared by G-I Holdings Inc. ("G-I") in the context of settlement negotiations with the United States Environmental Protection Agency ("EPA"), National Oceanic and Atmospheric Administration ("NOAA"), and the United States Department of the Interior, Fish and Wildlife Service ("DOI" and collectively with EPA and NOAA, the "United States") in an effort to resolve the claim filed by the United States in G-I's Chapter 11 Bankruptcy Case.

This confidential summary demonstrates that the assets and liabilities related to the Linden manufacturing facility, were ultimately transferred to and assumed solely by ISP Environmental Services Inc., formerly ISP 9 Corp. ("IES"). The "Linden Sites," as defined in the Consent Decree between G-I and the United States, include the following: (i) GAF Chemicals Site (EPA ID # NJD002185973; NJDEP Site ID (Master File) 66086; NJDEP PI # G000001667) (the "GAF Chemicals Site"); (ii) the LCP Chemicals Inc. Superfund Site (EPA ID # NJD079303020; NJDEP Site ID (Master File) 41246; NJDEP PI # G000003747) (the "LCP Site"); (iii) and the Diamond Alkali Site (EPA ID # NJD 980528996; NJDEP Site ID (Master File) 35956; NJDEP ID # 332812 (Newark Bay Study Area); NJDEP PI # 332799 (Passaic River Study Area).

Legal Framework

The basic principle underlying the legal framework applicable here is that liabilities under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA") extend to corporate successors of liable corporations. While the general rule is that a corporation that acquires the assets of another corporation is not the corporate successor of the selling corporation, an exception exists when the acquiring corporation expressly assumes the liabilities of the selling corporation. In that case, the latter corporation becomes the corporate successor of the entity from which it acquired the assets and liabilities. See Safety-Kleen, Inc. v. Arkema, Inc., 380 B.R. 716, 740 (D. Del. 2008) (citing Third Circuit law holding that the doctrine of successor liability provides that "where one corporation sells or transfers all or a substantial part of its assets to another, the transferee does not become liable for the debts and liabilities, including torts, of the transferor," however, the transferee "may be liable where it expressly assumes liability") (citations omitted); and Goodman v. Challenger International, Ltd., 1995 WL 402510, at *3 (E.D.Pa.), aff'd, 106 F.3d 395 (3rd Cir. 1996) ("It is well-established that a corporation that buys the assets of another corporation is not liable for the seller corporation's liabilities... An exception exists, however, where the purchaser expressly or impliedly assumes the seller's liabilities.") (citations omitted).

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Consistent with that framework, the corporate history detailed below establishes that IES acquired the liabilities related to the Linden facility, which liabilities were expressly assumed along with the assets to which they were related. In this particular instance, there are two independent bases to impose CERCLA liability for the Linden facility upon IES: (1) as the current owner of the valuable 143-acre piece of real estate that is the GAF Chemicals Site (see 42 U.S.C. §9607(a)(1)); and (2) as a corporate successor because it expressly assumed all known and unknown liabilities, including environmental liabilities, associated with the Linden facility when it acquired the assets.

Corporate History

Old GAF Corporation ("Old GAF") owned and operated a chemical facility in Linden, New Jersey. In 1972, Old GAF sold the LCP Site in Linden to LCP. We believe that LCP continued operations at that site until it filed for bankruptcy in or about 1991. Old GAF continued to own and operate the Linden facility until it filed a Plan of Liquidation in 1989. On April 10, 1989, Old GAF liquidated by way of a Plan of Complete Liquidation of GAF Corporation (the "Plan of Liquidation"). A copy of the Plan of Liquidation is attached hereto as Exhibit "A."

In the Plan of Liquidation, Old GAF transferred "all of its assets, subject to all of its liabilities . . . in complete cancellation of all its stock" to the following entities: Dorset Inc. ("Dorset"); Edgecliff, Inc. ("Edgecliff"); Merick Inc.; Perth Inc. and Clover Inc. (Plan of Liquidation ¶ 2.) In effect, the Plan of Liquidation transferred the assets and liabilities of the chemicals business which was operating in 1989 from Old GAF to Dorset.

The Plan of Liquidation provided that Old GAF transfer to Dorset "all the assets and liabilities, known and unknown, relating to its acetylenic chemicals, surfactants, specialty chemicals, organometalics, mineral products, industrial filters and filter vessels businesses (collectively, the "Chemicals Businesses"), including but not limited to . . . (C) all [Old GAF's] real property interests listed in Exhibit B attached hereto." (*Id.* ¶ 4(i).) Exhibit B to the Plan of Liquidation lists various properties, including: "Linden, New Jersey (Portion owned by GAF Corporation), Foot of S. Wood Avenue, P.O. Box 12, 07036."

On April 10, 1989, the same date the Plan of Liquidation was executed, Old GAF and Dorset also entered into an Instrument of Assignment and Assumption (the "1989 Assumption"). A copy of the 1989 Assumption is attached hereto as Exhibit "B." In addition to the transfer of assets in the paragraph above (*see* ¶ 1(i) of the 1989 Assumption), the 1989 Assumption provides that Old GAF assign the following to Dorset: "100% of the liabilities arising out of (A) the production of Amiben; (B) Project Aware environmental clean-up costs; and (C) environmental claims arising out of plants currently operating in the Chemicals Business[.]" (1989 Assumption ¶ 4(i).) The term "Project Aware" meant the environmental cleanup activities at the Linden facility. On April 11, 1989, Dorset changed its name to GAF Chemicals Corporation.

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In May 1991, as part of the reorganization of the chemicals business, GAF Chemicals Corporation sold and transferred its operating assets and related liabilities to various newly formed subsidiaries in consideration for shares of the common stock in such subsidiaries. GAF Chemicals Corporation then sold the stock of such subsidiaries to International Specialty Products Inc. ("ISP") in exchange for shares of ISP common stock and other consideration. Among these newly formed subsidiaries was ISP 9 Corp., now known as ISP Environmental Services Inc. ("IES"), which received all of GAF Chemical Corporation's assets in Linden, New Jersey. Various other wholly-owned subsidiaries likewise received specific assets from GAF Chemicals Corporation. For example, as the United States' recognized in its objection to G-I's Disclosure Statement, one of the other wholly-owned subsidiaries besides IES is ISP 6 Corp., now known as ISP Technologies Inc., which received various assets in Texas that were previously owned and operated by GAF Chemicals Corporation. At no time were GAF Chemicals Corporation's assets in Linden, New Jersey sold or otherwise transferred to any entity other than IES.

Additionally, on May 8, 1991, in connection with the reorganization of the chemicals business, IES entered into an Assumption of Liabilities and Continuing Obligations agreement with GAF Chemicals Corporation and GAF Corporation (the "1991 Assumption"), which is attached hereto as Exhibit "C." The 1991 Assumption provides that IES "assumes the proper, full and timely payment and performance of all the liabilities, contingent or otherwise, and obligations of [GAF Chemicals Corporation] described in the attached schedule[.]" (1991 Assumption at p 1.)

The Schedule attached to the 1991 Assumption states in its entirety: "All liabilities and obligations relating to the manufacture and sale of specialty chemicals at Linden, NJ, known and unknown, contingent or otherwise, including liabilities for the remediation of the Linden site and those liabilities shown on the balance sheet for ISP 9 Corp. dated as of May 8, 1991." (Id. at p 4.)

Further, the 1991 Assumption states that IES "shall indemnify, defend and hold harmless [GAF Chemicals Corporation, GAF Corporation] and all its other subsidiaries from and against any and all Assumed Liabilities and any and all liabilities, costs and expenses in connection with any investigations, claims, actions, suits or proceedings arising out of or resulting from the conduct of any business, ownership of any assets or incurrence of an liabilities or obligations on and after May 8, 1991 by [IES.]" (Id. at p 1.)

Conclusion

IES is thus the corporate successor to GAF's chemical business at Linden, New Jersey because of: (i) its ownership and continued operation of the assets at the Linden manufacturing facility; and (ii) its express assumption of the environmental liabilities of GAF and GAF Chemicals Corporation in the 1991 Assumption.

EXHIBIT A

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PLAN OF COMPLETE LIQUIDATION
OF

GAF Corporation
(a Delaware corporation)

The following plan of complete liquidation (the "Plan"), shall effect the complete liquidation of GAF Corporation, a Delaware corporation (the "Corporation"), in accordance with Section 332 of the Internal Revenue Code of 1986, as amended ("Section 332").

1. The Plan shall be effective, subject to the conditions hereinafter provided, upon its approval by the affirmative vote of the holders of all the outstanding shares of capital stock of the Corporation entitled to vote thereon. Such approval shall constitute approval of each of the actions contemplated by the Plan.

2. Within the Liquidation Period (as defined in paragraph 3 herein), the Corporation shall distribute and transfer to certain corporations listed herein, all of its assets, subject to all of its liabilities, in each case pursuant to the specific provisions of paragraphs 4 through 12 of this Plan, in complete cancellation of all its stock. Dorset Inc., a Delaware corporation ("Dorset"), GAF Building Materials Corporation, formerly known as Edgecliff Inc., a Delaware corporation ("Edgecliff"), Merick Inc., a Delaware corporation

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("Merick"), Perth Inc., a Delaware corporation ("Perth") and Clover Inc., a Delaware corporation ("Clover") shall each continue to own until the liquidation is completed all the stock of the Corporation which each owns on the date of adoption of the Plan.

3. The "Liquidation Period", as used herein, shall mean the period beginning on the date of adoption of this Plan and ending three years from the close of the taxable year in which the first distribution is made, provided that the liquidation shall be substantially completed by April 10, 1989.

4. The Corporation shall transfer to Dorset:

(i) all the assets and liabilities, known and unknown, relating to its acetylenic chemicals, surfactants, specialty chemicals, organometalics, mineral products, industrial filters and filter vessels businesses (collectively, the "Chemicals Businesses"), including but not limited to: (A) all the outstanding stock of GAF Chemicals Corp., General Aniline and Film Corp., GAF Realty Corporation, GAF International Corporation, Ludlow Inc., Bluehall Inc., Mossbank Inc., Alkaril Chemicals Ltd. (Canada), GAF (Australasia) Pty. Ltd., GAF (Belgium) N.V., GAF do Brasil Industria e Comercio Ltda, GAF (Canada) Inc., GAF (Deutschland) GmbH, GAF (France) S.A., GAF Freight Services N.V. (Belgium), GAF (Great Britain) Co. Ltd., GAF (Hong Kong) Limited, GAF Insurance Ltd. (Bermuda), GAF (Italia) S.r.l., GAF (Japan) Ltd., GAF Corporation de Mexico,

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S.A. de C.V., GAF (Norden) A.B., GAF (Osterreich) Ges.m.b.H., GAF Sales (U.K.) Limited, GAF (Singapore) Pte. Ltd., GAF (Switzerland) A.G., GAF (U.S. Virgin Islands), Inc., and all the shares of GAF-Huls Chemie GmbH held by the Corporation; (B) all right, title and interest of the Corporation in and to all the technologies used by the Corporation relating to the Chemicals Businesses, including, but not limited to the patents and trademarks listed in Exhibit A attached hereto; (C) all the Corporation's real property interests listed in Exhibit B attached hereto;

(ii) notwithstanding any other provision of this Plan, all its trademarks or tradenames that contain the name "GAF", including, but not limited to those contained in Exhibit C attached hereto (to the extent owned by the Corporation);

(iii) liabilities arising out of (A) the production of Amiben; (B) Project Aware environmental clean-up costs; and (C) environmental claims arising out of plants currently operating in the Chemicals Businesses; and

(iv) all of its assets, known or unknown, the transfer, conveyance, or assignment of which is not otherwise provided for in this Plan including, but not limited to, any land, leases, buildings, real property, plant, equipment, inventory, contract rights, receivables, trademarks, intangibles, discontinued products and other assets.

The net fair market value of the assets transferred to Dorset shall comprise, in aggregate, 87.43655% of the net fair market value of the Corporation's assets.

5. The Corporation shall transfer to Edgecliff:

(1) all the assets and liabilities, known and unknown, relating to its commercial and residential roofing materials business (excepting the mineral product business), including: (A) the assets and liabilities acquired by the Corporation as a result of and upon the merger of GAF Building Materials Corporation into the Corporation, which include, but are not limited to, all the outstanding stock of GAF Real Properties, Inc., GAFTECH Inc., and BMC Acquisition Corp. and also including contract rights, receivables, trademarks, intangibles, and other assets and liabilities, known or unknown, relating to its commercial and residential roofing materials business (excepting the mineral products business); (B) all the land, leases, buildings, real property, property, plant, equipment, inventory, and other assets at the facilities and addresses listed in Exhibit D attached hereto; and (C) all right, title and interest of the Corporation in and to all the technologies used by the Corporation relating to the commercial and residential roofing materials business (excepting the mineral products business), including, but not limited to the patents and trademarks listed in Exhibit E attached hereto;

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(ii) all liabilities, costs, fees and expenses, known and unknown, arising out of all claims, lawsuits or other actions (A) seeking recovery for bodily injury, sickness, disease or death alleged to have been caused in whole or in part by any asbestos or asbestos-containing material whether in the work place or otherwise, (B) seeking to recover the cost of abatement, removal or replacement of asbestos or asbestos-containing material from any public, commercial or private building or other structure, including the cost of health screenings, inspections and operation and maintenance programs, (C) seeking the clean-up of asbestos or asbestos-containing material from any land fill, waste disposal or other site, and (D) any other liability related to the manufacture, sale or use of asbestos or asbestos-containing material, whether arising pursuant to a contractual agreement or under Federal, state or local law, ordinance, regulation, rule or common law (in contract, tort or otherwise) (all such liabilities are hereinafter referred to as "Asbestos-Related Liabilities"), and all persons dedicated to the administration of Asbestos-Related Liabilities; and

(iii) all liabilities arising out of (A) shingle claims for discontinued products, (B) plant shutdowns, and (C) environmental claims from plants no longer operating and from oil waste pollution.

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The net fair market value of the assets transferred to Edgecliff shall comprise, in the aggregate, 10.84552% of the net fair market value of the Corporation's assets.

6. The Corporation shall transfer to Merick:

(i) all the outstanding stock of GAF Broadcasting Company and The Classical Shopper, Inc.; and

(ii) any contract rights, receivables, trademarks, patents, copyrights, intangibles and other assets or liabilities, known or unknown, relating to GAF Broadcasting Company and the Classical Shopper, Inc.

The net fair market value of the assets transferred to Merick shall comprise, in the aggregate, 1.43884% of the net fair market value of the Corporation's assets.

7. The Corporation shall transfer to Perth all the outstanding stock of GAF Insurance Ltd.

The net fair market value of the assets transferred to Perth shall comprise, in the aggregate, .26752% of the net fair market value of the Corporation's assets.

8. The Corporation shall transfer to Clover all the assets and liabilities, known and unknown acquired by the Corporation as a result of and upon the merger of GAF Export Corporation with and into the Corporation, which include, but are

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not limited to, all the land, leases, buildings, real property, property, plant equipment, inventory and other assets at the facilities and addresses listed on Exhibit F attached hereto, as well as any contract rights, receivables, trademarks, intangibles and other assets and liabilities, known or unknown relating to its export business.

The net fair market value of the assets transferred to Clover will comprise, in the aggregate, .01157% of the net fair market value of the Corporation's assets.

9. Notwithstanding any other provision of this Plan, Edgecliff shall assume 100% of all Asbestos-Related Liabilities, and Dorset, Merick, Perth and Clover shall not assume and shall not be liable for any Asbestos-Related Liabilities.

10. The Corporation shall transfer, convey, set over and assign all its duties, obligations and liabilities, under the 11 3/8% senior subordinated notes due June 15, 1995; the 10 3/8% senior subordinated notes due November 1, 1994; and the 10 7/8% senior subordinated debentures due November 1, 2001, all issued by the Corporation (collectively, the "Bonds"), to Dorset, Edgecliff, Merick, Perth and Clover, jointly and severally; and Dorset, Edgecliff, Merick, Perth and Clover by execution of Supplemental Indentures substantially in the form attached as Exhibit G shall undertake, assume and agree to perform, pay or discharge, jointly and severally (and be liable as among

themselves, 87.43655% by Dorset, 10.84552% by Edgecliff, 1.43884% by Merick, .26752% by Perth and .01157% by Clover) all the duties, obligations and liabilities of the Corporation with respect to (and to defend, indemnify and hold harmless the Corporation from and against all losses, liabilities and expenses, including legal fees and court costs, suffered or incurred in connection with) the Bonds.

11. The Corporation shall transfer, convey, set over and assign all its duties, obligations and liabilities, the transfer, conveyance, assignment or assumption of which is not otherwise provided for under this Plan, including, but not limited to, its liabilities (A) under the note issued by the Corporation to G-I Holdings Inc. on March 29, 1989 with a principal amount of \$5,170,300, (B) for workers compensation and medical benefits for retirees and former employees of discontinued operations, (C) for insurance claims arising for the 1983-84 year during which the Corporation was self-insured, (D) for pension plan termination liabilities, (E) for the redemption of Preferred Stock of the Corporation, and (F) for other legal claims, but excluding all Asbestos-Related Liabilities (all such liabilities collectively the "Other Liabilities") 87.43655% to Dorset, 10.84552% to Edgecliff, 1.43884% to Merick, .26752% to Perth and .01157% to Clover, severally; and Dorset, Edgecliff, Merick, Perth and Clover shall undertake, assume and agree to perform, pay or discharge, severally (87.43655% by Dorset, 10.84552% by

Edgecliff, 1.43884% by Merick, .26752% by Perth and .01157% by Clover) all the duties, obligations and liabilities of the Corporation with respect to (and to defend, indemnify and hold harmless severally the Corporation from and against all losses, liabilities and expenses, including legal fees and court costs, suffered or incurred in connection with) the Other Liabilities.

12. Dorset, Edgecliff, Merick, Perth, and Clover shall each enjoy, to the fullest extent permitted under applicable law, the benefit of all insurance coverage of the Corporation in effect on the date the Plan is adopted.

13. Immediately after the adoption of the Plan, the officers of the Corporation shall cause to be executed and filed a Certificate of Dissolution of the Corporation in accordance with the General Corporation Law of the State of Delaware. After the distribution and transfer of assets pursuant to this Plan, the Corporation shall not carry on any activities other than for the purpose of winding up its affairs in accordance with Delaware law.

14. The Board of Directors and each of the officers of the Corporation are authorized to approve changes to the terms or timing (provided that in no event may any distributions pursuant to the Plan occur before or after the Liquidation Period) of any of the transactions referred to herein, to interpret any of the provisions of the Plan, to make, execute and

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deliver such other agreements, conveyances, assignments, transfers, certificates and other documents and take such other actions as such Board of Directors and any such officers deem necessary or desirable, including such actions as may be necessary or desirable in order to carry out the provisions of the Plan.

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Exhibit A

Dorset Patents and Trademarks

omitted from this copy.

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DRAFT 3/27/89
TAX 046525664W
36854/0012

Exhibit B

Dorset Real Property

CHARMIAN, PENNSYLVANIA
Route 116
GAF Charmian, P.O. Box J
Blue Ridge Summit, Pennsylvania 17214

HAGERSTOWN, MARYLAND (Portion owned by GAF Corporation)
34 Charles Street (Zip Code 21740)
P.O. Box 1418
21741

KREMLIN, WISCONSIN (Portion owned by GAF Corporation)
Kremlin Plant and Quarry
Pembine, Wisconsin
54156

LINDEN, NEW JERSEY (Portion owned by GAF Corporation)
Foot of S. Wood Avenue
P.O. Box 12
07036

BINGHAMTON, NEW YORK
Parking Lot

"HIGHLY CONFIDENTIAL"

Exhibit C

Trademarks Containing the Name "GAF"

Omitted from this copy.

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Exhibit D

Edgecliff Real Property

BALTIMORE, MARYLAND
1500 So. Ponca Street
P.O. Box 9977
21224

CHESTER, SOUTH CAROLINA
190 Orrs Road
29706

DALLAS, TEXAS
2600 Singleton Blvd. (Zip Code 75212)
P.O. Box 655607
75265-5607

ERIE, PENNSYLVANIA
Foot of Sassafras Street
P.O. Box 1128
16512

FONTANA, CALIFORNIA
11800 Industry Avenue S.W. Industrial Park
92335

IRWINDALE, CALIFORNIA
6230 Irwindale Avenue
P.O. Box 2148
91706

MILLIS, MASSACHUSETTS
60 Curve Street
02054

MINNEAPOLIS, MINNESOTA
50 Lowry Avenue N.
55411

MOBILE, ALABAMA
2400 Emogene Street
P.O. Box 6377
36660

MOUNT VERNON, INDIANA
Givens Road
47620

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NASHVILLE, TENNESSEE
Fiberglass Road
37210

PLAINFIELD, ILLINOIS
600 Lockport Street
60544

SAVANNAH, GEORGIA
1 Brampton Road
P.O. Box 7329
31418

SOUTH BOUND BROOK, NEW JERSEY
35 Main Street
08880

TAMPA, FLORIDA
5138 Madison Avenue
P.O. Box 5176
33675

GLOUCESTER CITY
New Jersey

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Exhibit E

Edgecliff Patents and Trademarks

Omitted from this copy.

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Exhibit F

Clover Real Property

GAF EXPORT CORPORATION
Suite 206B, Iturregui Plaza
65th Infanteria Avenue
Rio Piedras, Puerto Rico 00924

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Exhibit c

Supplemental Indentures

Omitted from this copy.

EXHIBIT B

"Highly Confidential"

AND ASSUMPTION

INSTRUMENT OF ASSIGNMENT AND ASSUMPTION, dated as of April 10, 1989, by and among GAF Corporation (the "Corporation") and Dorset Inc. ("Dorset"), both Delaware corporations (the "Instrument").

WHEREAS, the holders of all the outstanding shares of capital stock of the Corporation entitled to vote thereon have adopted and approved a Plan of Complete Liquidation of the Corporation (the "Plan");

WHEREAS, Dorset owns 87.43655% of the capital stock of the Corporation;

WHEREAS, pursuant to the Plan, the Board of Directors of the Corporation has determined to effect the distribution and transfer of all of its assets and liabilities to all of its stockholders;

WHEREAS, pursuant to the Plan, the Corporation has filed a Certificate of Dissolution in the state of Delaware;

NOW, THEREFORE, in consideration of the premises and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto take the following actions:

1. The Corporation hereby transfers, conveys, sets over and assigns to Dorset:

(1) all the assets and liabilities, known and unknown, relating to its acetylenic chemicals, surfactants, specialty chemicals, organometalics, mineral products, industrial filters and filter vessels businesses (collectively, the "Chemicals Businesses"), including but not limited to: (A) all the outstanding stock of GAF Chemicals Corp., General Aniline and Film Corp., GAF Realty Corporation, GAF International Corporation, Ludlow Inc., Bluehall Inc., Mossbank Inc., Alkaril Chemicals Ltd. (Canada), GAF (Australasia) Pty. Ltd., GAF (Belgium) N.V., GAF do Brasil Industria e Comercio Ltda, GAF (Canada) Inc., GAF (Deutschland) GmbH, GAF (France) S.A., GAF Freight Services N.V. (Belgium), GAF (Great Britain) Co. Ltd., GAF (Hong Kong) Limited, GAF Insurance Ltd. (Bermuda), GAF (Italia) S.r.l., GAF (Japan) Ltd., GAF Corporation de Mexico, S.A. de C.V., GAF (Norden) A.B., GAF (Osterreich) Ges.m.b.H., GAF Sales (U.K.) Limited, GAF (Singapore) Pte. Ltd., GAF (Switzerland) A.G., GAF (U.S. Virgin Islands), Inc., and all the shares of GAF-Huls Chemie GmbH held by the Corporation; (B) all right, title and interest of the Corporation in and to all the technologies and trademarks and tradenames used by the Corporation relating to the Chemicals Businesses, including, but not limited to the patents and trademarks listed in Exhibit A attached hereto; (C) all the Corporation's real property interests listed in Exhibit B attached hereto;

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(ii) notwithstanding any other provision of this Instrument, all its trademarks or tradenames that contain the name "GAF", including, but not limited to those contained in Exhibit C attached hereto (to the extent owned by the Corporation); and

(iii) all of its assets, known or unknown, not otherwise transferred, conveyed, set over, or assigned or assumed under this Instrument or under Instruments of Assignment and Assumption of even date herewith between the Corporation and one or all of its stockholders (collectively, the "Other Instruments"), including, but not limited to, any land, leases, buildings, real property, plant, equipment, inventory, contract rights, receivables, trademarks, intangibles, discontinued products and other assets.

2. Dorset hereby undertakes, assumes and agrees to perform, pay or discharge all of the duties, obligations and liabilities of the Corporation with respect to (and to defend, indemnify and hold harmless the Corporation from and against all losses, liabilities and expenses, including legal fees and court costs, suffered or incurred in connection with) the assets and liabilities transferred, conveyed, set over or assigned to it under paragraph 1 above.

3. Notwithstanding any other provision of this Instrument, Dorset shall not assume and shall not be liable for

any liabilities, costs, fees and expenses, known or unknown, arising out of any claims, lawsuits or other actions (A) seeking recovery for bodily injury, sickness, disease or death alleged to have been caused in whole or in part by any asbestos or asbestos-containing material whether in the work place or otherwise, (B) seeking to recover the cost of abatement, removal or replacement of asbestos or asbestos-containing material from any public, commercial or private building or other structure, including the cost of health screenings, inspections and operation and maintenance programs, (C) seeking the clean-up of asbestos or asbestos-containing material from any land fill, waste disposal or other site, and (D) any other liability related to the manufacture, sale or use of asbestos or asbestos-containing material, whether arising pursuant to a contractual agreement or under Federal, state or local law, ordinance, regulation, rule or common law (in contract, tort or otherwise) (collectively, the "Asbestos-Related Liabilities").

4. The Corporation hereby transfers, conveys, sets over and assigns to Dorset:

(1) 100% of the liabilities arising out of (A) the production of Amiben; (B) Project Aware environmental clean-up costs; and (C) environmental claims arising out of plants currently operating in the Chemicals Businesses (collectively, the "Specific Liabilities"); and

"HIGHLY CONFIDENTIAL"

(ii) 87.43655% of its duties, obligations and liabilities, not otherwise transferred, conveyed, set over, or assigned or assumed under this Instrument or under the Other Instruments (all such duties, obligations and liabilities collectively the "Other Liabilities"), including, but not limited to, its liabilities (A) under the note issued by the Corporation to G-I Holdings Inc. on March 29, 1989 with a principal amount of \$5,170,300, (B) for workers compensation and medical benefits for retirees and former employees of discontinued operations, (C) for insurance claims arising with respect to the 1983-84 year during which the Corporation was self-insured, (D) for pension plan termination liabilities, (E) for the redemption of the Preferred Stock of the Corporation, and (F) for other legal claims, but excluding all Asbestos-Related Liabilities.

Dorset hereby undertakes, assumes and agrees to perform, pay or discharge all the duties, obligations and liabilities of the Corporation with respect to (and to defend, indemnify and hold harmless severally the Corporation from and against all losses, liabilities and expenses, including legal fees and court costs, suffered or incurred in connection with) 100% of the Specific Liabilities and 87.43655% of the Other Liabilities.

5. Dorset shall enjoy, to the fullest extent permitted under applicable law, the benefit of all insurance coverage of the Corporation in effect on the date of the adoption of the Plan.

"HIGHLY CONFIDENTIAL"

6. The parties hereto hereby agree to execute and deliver such further instruments and documents as any party shall reasonably request to effect the foregoing transactions.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed the day and year first above written.

GAF Corporation

By _____

Dorset Inc.

By _____

EXHIBIT C

"Highly Confidential"

~~X~~
ASSUMPTION OF LIABILITIES AND CONTINUING OBLIGATIONS

This Assumption is made on May 8, 1991 by
ISP Environmental Service
ISP 9 Corp., a Delaware corporation ("Subsidiary") in favor
of GAF CHEMICALS CORPORATION, a Delaware corporation ("GCC")
and GAF Corporation, a Delaware corporation ("GAF").

Subsidiary hereby assumes the proper, full and
timely payment and performance of all the liabilities,
contingent or otherwise, and obligations of GCC described in
the attached schedule (the Assumed Liabilities").

Subsidiary shall indemnify, defend and hold
harmless GCC, GAF and its other subsidiaries from and
against any and all Assumed Liabilities and any and all
liabilities, costs and expenses in connection with any
investigations, claims, actions, suits or proceedings
arising out of or resulting from the conduct of any
business, ownership of any assets or incurrence of any
liabilities or obligations on and after May 8, 1991 by
Subsidiary. If GCC or GAF shall receive notice of any such
investigation, claim, action, suit or proceeding, it shall
promptly notify Subsidiary which shall be entitled and
obligated to defend or settle the same through its own
counsel and at its own expense, but GCC or GAF, as the case
may be, shall provide any cooperation reasonably requested
by Subsidiary upon receipt of reasonable assurance from

"HIGHLY CONFIDENTIAL"

Subsidiary that it will reimburse the reasonable cost of such cooperation. Notwithstanding the foregoing, any liabilities, costs and expenses which are apportioned pursuant to, or against which indemnification is provided under the Tax Sharing Agreement referred to in Section 3.3 of the Reorganization Agreement dated as of May 8, 1991 between GCC, GAF, Subsidiary and certain other subsidiaries of GCC (the "Reorganization Agreement"), shall be treated as provided for in such Tax Sharing Agreement and shall be excluded for purposes of this Assumption.

Subsidiary disclaims any assumption or other responsibility for the liabilities and continuing obligations of GCC, GAF or any of its other subsidiaries other than those expressly assumed herein and shall be indemnified against such liabilities and obligations by GCC and GAF to the extent provided in Section 4.2 of the Reorganization Agreement.

"HIGHLY CONFIDENTIAL"

IN WITNESS WHEREOF, the parties have executed this Agreement on the date first above written.

ISP 9 CORP.

By Stephen G. [Signature]
Senior Vice President

Acknowledged and Agreed:

GAF CHEMICALS CORPORATION

By Stephen A. [Signature]
Senior Vice President

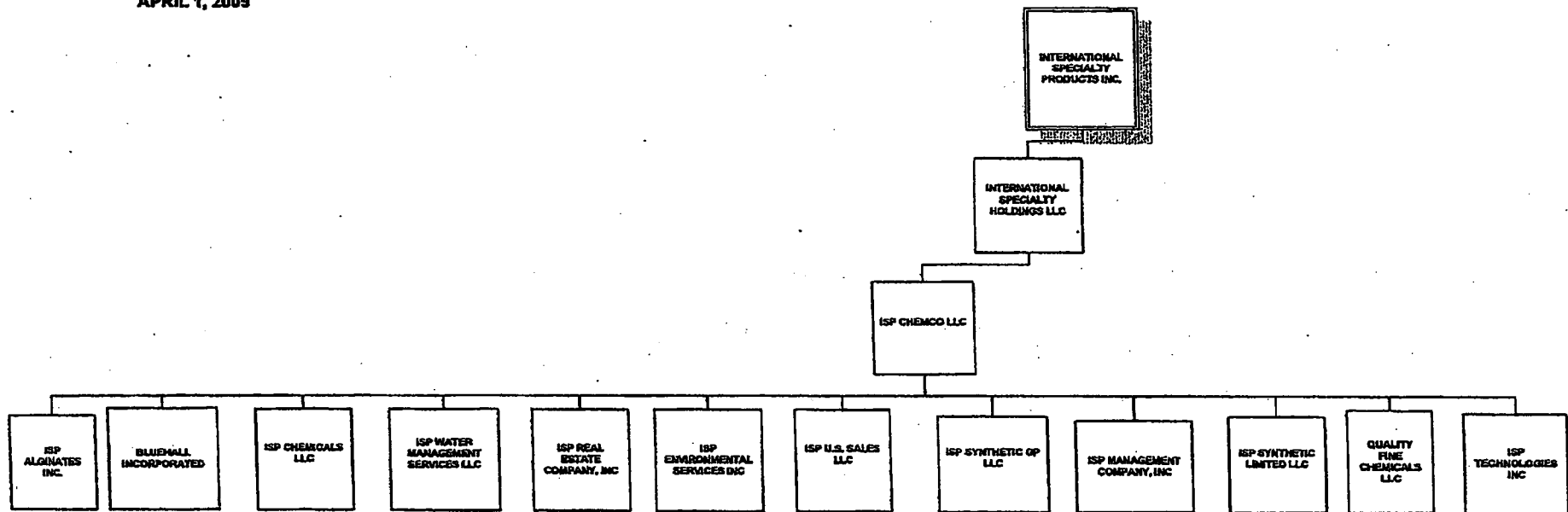
"HIGHLY CONFIDENTIAL"

SCHEDULE OF LIABILITIES AND OBLIGATIONS

All liabilities and obligations relating to the manufacture and sale of specialty chemicals at Linden, NJ, known and unknown, contingent or otherwise, including liabilities for the remediation of the Linden site and those liabilities shown on the balance sheet for ISP 9 Corp. dated as of May 8, 1991.

"Highly Confidential"

**ORGANIZATIONAL CHART
ISP ENVIRONMENTAL SERVICES INC.
APRIL 1, 2009**



HIGHLY CONFIDENTIAL

Fed. R. Evidence 408(a)
For Settlement Purposes Only

IES Insurance Receivable

<u>Carrier</u>	<u>Estimated Amount</u>	<u>Timing from Bankruptcy Court Approval</u>
Carrier A	4,480,292	30 days
Carrier B	4,235,628	60 days
Carrier C	813,264	30 days
Carrier D	7,115,816	half in 30 days, half December 2009
Total	16,645,000	

"Highly Confidential"

The ISP Environmental Services, Inc. ("IES") Linden Property is currently the subject of pending but stayed litigation in the Superior Court of New Jersey, Law Division, Union County, New Jersey, bearing Docket No. UNN-L-1697-07. IES is the plaintiff, and the defendants are the City of Linden, Richard J. Gerbounka, in his capacity as Mayor of the City of Linden; John T. Gregorio, individually (the former Mayor); the Council of the City of Linden; the Planning Board of the City of Linden; the Union County Improvement Authority; the Morris Companies; Morris Linden Associates, LLC; and Joseph D. Morris. IES initiated the litigation in opposition to several Linden Ordinances, because those ordinances would effectively prevent IES from developing its own property and instead would enable the Morris Companies to develop it.

The Linden Ordinances being challenged would combine the development plan for the Site with a plan for an adjacent piece of property owned by E.I. du Pont de Nemours and Company ("DuPont") and name Morris Companies as the site developer for the combined site. These ordinances were directly contrary to prior promises and communications between IES and Linden where IES fully expected that it would be able to redevelop its own property. A July 23, 2008 ruling arising out of a companion case DuPont initiated, vacated the three ordinances affecting development, including the one that ratified and reaffirmed the ordinance requiring a combined development plan. The court vacated the ordinances on procedural due process grounds, leading to the renewed hearings described in the next paragraph, below. There are appeals pending in the DuPont litigation.

On March 24, 2009, the Linden Planning Board began reconsidering whether the IES and/or DuPont sites were area(s) in need of redevelopment under the applicable statute, and at least one additional hearing date will be needed before the Linden Planning Board comes to a recommendation. The March 24, 2009 hearing has been continued and the next hearing date is scheduled for April 29, 2009. Once the Linden Planning Board makes a recommendation to the Linden City Council, the Linden City Council must meet to consider passing such City Ordinances and/or Resolutions as necessary to carry out the recommendation. Assuming the Linden City Council decided to pass an Ordinance designating the IES Property as a property in need of redevelopment and re-designating the Morris Companies as the redeveloper there will be public notice of that activity. Even after such Ordinances and/or Resolutions are passed the designated redeveloper (or such entity as may be pursuing condemnation rights) is required to undertake good faith negotiations with the property owner to purchase the property for fair market value prior to the institution of condemnation proceedings. Assuming such negotiations fail, the designated redeveloper can only then request that the City of Linden begin eminent domain proceedings. As a result of these multiple procedural steps, no eminent domain action is imminent.

BLANK DIVDER



To: **Distribution**
Location: **Wayne**

Date **May 5, 1992**
CC:

From:
Location: **Deborah D. Lawson**
Wayne/10

Subject: **Liquidation of GAF Corporation (April 10, 1989)**

I. BACKGROUND

Under the Internal Revenue Code, the distribution of assets in a liquidation will only be treated as tax free with respect to distributions to shareholders that own at least 80% of the common stock of the liquidating corporation. Therefore, in order to limit the tax liability created by the liquidation of GAF Corporation ("Old GAF") on April 10, 1989 (while preserving the separate corporate existence of each of Old GAF's businesses), at least 80% of the net fair market value of Old GAF had to be distributed to one shareholder which would then be treated as the successor of Old GAF for tax purposes.

To achieve this result, the five shareholders of Old GAF - GAF Chemicals Corporation (formerly Dorset Inc., "GCC"), GAF Building Materials Corporation (formerly Edgecliff Inc., "BMC"), Perth Inc., Merick Inc. and GAF Export Corporation (formerly Clover Inc., "Export") - approved a plan of liquidation (the "Plan of Liquidation") which transferred Old GAF's chemicals business and as many of Old GAF's other miscellaneous assets as possible (which were not otherwise necessary to the operation of, or reasonably related to, its building materials, broadcasting or insurance businesses) to GCC. Conversely, the Plan of Liquidation transferred to GCC only those liabilities which were related to Old GAF's ongoing chemicals business; all other liabilities which could be reasonably transferred to another shareholder were transferred to BMC, Perth, Merick or Export, and miscellaneous liabilities were divided pro rata among all the shareholders according to the percentage that the net fair market value of the assets and liabilities specifically assigned each shareholder in the liquidation bore to the total net fair market value of Old GAF as a whole.

The only exception to this approach was made for GAF Export Corporation ("Old Export") which handled chemicals sales made through or to Puerto Rico. Because it held Old GAF common stock

(which it had received upon conversion of certain Old GAF debentures in 1986), it had to merge into Old GAF prior to completion of the management-led buyout on March 29, 1989 so its Old GAF stock could be cancelled. Although its assets and liabilities could thereafter be transferred to and combined with GCC's, for tax reasons it could not be separately reincorporated as a subsidiary of GCC. Since tax planning dictated that the Puerto Rican operations be held separately from GCC's domestic operations, the assets and liabilities of Old Export had to be transferred to a different shareholder.

Following implementation of the Plan of Liquidation, the shareholders of Old GAF held the following percentages of net assets of Old GAF:

GCC	87.43655%
BMC	10.84552%
Merick (broadcasting)	1.43884%
Perth (insurance)	.26752%
Export	.01157%

The development of the liquidation strategy for Old GAF and the preparation of the Plan of Liquidation were handled by the Tax Department in conjunction with Steve Todrys of Kramer Levin. The specific distributions of assets and liabilities to the shareholders were determined by the Tax Department in conjunction with Valuation Research Corporation, which provided an opinion on the net fair market value of GCC following the liquidation.

A copy of the Plan of Liquidation and a set of charts showing the timing and mechanics of the liquidation of Old GAF (including the merger of GAF Building Materials Corporation ("Old BMC") and Old Export into Old GAF shortly before, and in facilitation of, the liquidation of Old GAF) is attached for your information.

II. DISTRIBUTION OF LIABILITIES

Specifically, the liabilities of Old GAF were distributed under the Plan of Liquidation as follows:

A. GCC

1. "All...liabilities, known and unknown relating to [Old GAF's] acetylene chemicals, surfactants, specialty chemicals, organometalics, mineral products, industrial filters and filter vessels businesses (collectively, the "Chemicals Businesses")." Although not expressly stated, this verbal formulation was intended to transfer only those liabilities related to the then ongoing operations of Old GAF's chemicals businesses so that liabilities of discontinued or sold operations such as film and dyes were not transferred to GCC.

2. The only exceptions to this scheme are specifically enumerated in the Plan and are the liabilities arising out of:

- (a) production of Amiben
- (b) Linden clean-up costs
- (c) environmental claims arising out of plants currently operating the Chemicals Businesses.

B. BMC

1. "All...liabilities, known and unknown, relating to its commercial and residential roofing materials business (except the mineral product business) including...the liabilities acquired by [Old GAF] as a result of and upon the merger of [Old BMC] into [Old GAF]...."

2. All asbestos-related liabilities of any type.

3. All liabilities arising out of:

- (a) shingle claims for discontinued products
- (b) plant shutdowns (any Old GAF business)
- (c) environmental claims from plants no longer operating (any GAF business)
- (d) environmental claims from oil waste pollution (any Old GAF business)

C. Merick (parent of GAF Broadcasting Company, Inc. and The Classical Shopper, Inc.)

"All...liabilities, known or unknown, relating to GAF Broadcasting Company, Inc. and The Classical Shopper, Inc." Since most of the liabilities of the broadcasting business were the direct liabilities of GAF Broadcasting and The Classical Shopper and not Old GAF, the liabilities of Old GAF which related to these two subsidiaries consisted primarily of the litigation related liabilities stemming from the Concert Radio case and Listeners Guild challenge to the FCC license.

D. Perth (parent of GAF Insurance Ltd.)

None.

E. Export

"All...liabilities, known and unknown acquired by [Old GAF] as a result and upon the merger of [Old Export] with and into [Old GAF] which include...all the...liabilities, known or unknown relating to its export business."

F. Joint and Several Liabilities

The Old GAF 10-3/8% Senior Subordinated Notes due 1994 and 11-3/8% Senior Subordinated Notes due 1995 were jointly and severally assigned to and assumed by GCC, BMC, Merick, Perth and Export. Among themselves, however, they are liable only for the percentage of the Notes represented by their net market value percentages set forth above.

G. Miscellaneous Liabilities

Each of the shareholders are also liable for their proportionate share (according to their net market value percentages set forth above) of all liabilities of Old GAF not otherwise allocated under the Plan including:

1. A \$5,170,300 intercompany note issued by Old GAF to G-I Holdings Inc. on March 29, 1989 (now cancelled).
2. Workers compensation and medical benefits for retirees and former employees of discontinued operations.
3. Insurance claims arising for the 1983-84 year during which Old GAF was self-insured.
4. Pension plan termination liabilities.
5. Redemption of Old GAF Preferred Stock.
6. Other legal claims (excluding all asbestos-related liabilities).

H. Liabilities Transferred by Operation of Law

As discussed above, only liquidating distributions to shareholders owning at least 80% of the stock of the liquidating company are tax free. Thus the distributions made by Old GAF to BMC, Perth, Merick and Export were taxable, albeit on a deferred basis. These deferred taxes were liabilities of Old GAF and, under the tax law, passed to GCC, as Old GAF's successor for tax purposes, upon Old GAF's liquidation.

III. SUBSEQUENT TRANSFER OF LIABILITIES

The liabilities distributed under the Plan of Liquidation can be transferred again by their recipients without restriction and without jeopardizing the original tax free treatment of Old GAF's liquidating distribution to GCC. At one point we talked about but never did transfer certain liabilities of BMC related to discontinued operations to GAF Corporation (formerly Newco Holdings Inc.). We did, of course, transfer certain liabilities

of GCC to International Specialty Products Inc. and its subsidiaries. Any additional transfer of liabilities would be accomplished in the same way the ISP transfer was done - by execution of an assignment and assumption agreement approved by the boards of directors of the companies involved. If the transfer of liabilities is made without consideration it would be treated as a capital contribution by the assuming corporation. The tax treatment of any such transfer would depend upon the structure of the transfer and would have to be separately analysed.

coj
D.D.L.

Distribution

S.A. Block
S.J. Heyman
J.P. Rogers
R. Steinfeld
J.H. Stern
J.J. Strupp
A. Yanofsky

memos/miller

MEMO

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO Peter T. Lynch, Chief, Metro Bureau of Regional Enforcement
Armando A. Arcenal through
 FROM Stefan D. Sedlak DATE December 23, 1985
 SUBJECT GAF Corporation - Linden Facility
 NJPDES No. NJ 0000019

On December 19, 1985 a meeting was held at the DWR office in Prospect Street between representatives from GAF Corporation, AWARE (GAF Environmental Consultant), and DWR. In attendance were the following:

A. Lindenauer - VP Mat. Management, GAF
 A.J. ten Braun - Director, Env't'l. Engg., GAF
 Greg Pullian - Division Director, Wastewater, AWARE
 Robert D. Mutch, Jr. - Group Vice-President, "
 Arnold Schiffman - Director, WQM-DWR
 Paul C. Kurisko - Chief, Ind't'l. Waste Mngt., DWR
 Edward H. Post - Section Chief, " " "
 Ram Pyarillal - Supervising Engineer, " " "
 Armando A. Arcenal - Env't'l. Engr., Metro Enf. "
 Ronald F. Carper, Jr. - Geologist, DWR
 Guy Tomassoni - " " "

The meeting was held to discuss GAF NJPDES permit renewal and modification. The renewal relates to the discharge to surface water from the Wastewater Treatment Facility. The modification relates to the discharge to groundwater from the entire site, specifically fill areas and the wastewater ditches.

The key issues discussed were:

A. Surface Discharge Renewal Requirements:

1. Eighty-five (85) per cent BOD removal will be required for the treatment facility.
2. A discharge toxicity limit of a bioassay-measured LC50 (lethal to 50 per cent of the test organisms) as a 50 per cent dilution of the discharge.
3. A Best Management Practices (BMP) Plan will be required for the facility.

B. Groundwater Discharge Modification:

GAF has an open ditch wastewater collection system; drum landfill operated from 1970 to 1973 and an industrial waste landfill operated from 1955 to 1970.

.....GAF Memorandum dated December 23, 1985

The NJPDES permit will require comprehensive investigation to evaluate and regulate groundwater discharges.

To meet the permit renewal and modification, GAF submitted the report "Supplemental Information and compliance Plan, NJPDES Permit No. NJ 0000019, GAF Corporation, Linden Plant" dated December 1985 prepared by AWARE Incorporated for GAF.

Greg Pulianni and Bob Mutch of AWARE discussed the report which proposes a phased approach in dealing with the key issues. The time frame is anticipated to be between 40 to 52 months.

Paul Kurisko commented that GAF should have looked into remedial measures to meet the plant's 85 per cent BOD removal and that the time frame is too long for permit compliance. The GAF wastewater treatment plant effluent toxicity over the past year has been less than 5 per cent LC50.

Later, Mr. Schiffman joined the meeting and explained that GAF's renewed and modified NJPDES permit will be issued. Since GAF will not be able to comply with the permit requirements, GAF will be required to enter into an Administrative Consent Order with the Department. The ACO will set forth a permit compliance schedule; penalty assessment for noncompliance with the permit limitations; and stipulated penalties should GAF fail to meet the permit compliance schedule.

By copy of this memo, the offices of Industrial Waste Management and Ground Water Discharge Permits are requested to provide the Metro Bureau of Regional Enforcement with their comments on the GAF submittal.

E122:G25

cc: Paul C. Kurisko
Ronald F. Carper, Jr.

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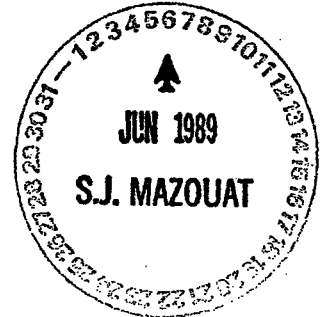
A Subsidiary of
GAF CORPORATION



cc: P UETTER
orig FILE 3.600.07

S. Mazouat
cc: Sr. Staff

June 2, 1989



Mr. E. Ryan
Novotny & Associates
Public Relations
Two Tudor City Place
New York, NY 10017

Dear Mr. Ryan:

Updating my letter to you of March 28 regarding the Administrative Consent Order (ACO) between GAF Chemicals and the NJ DEP on the Linden Plant permit to discharge treated waste water into the Arthur Kill, we have signed the ACO today, June 2, 1989. The signed document will be delivered to the NJ DEP on Tuesday, June 6, 1989.

The only revision to the attached statement in response to press questions are the name of the consultant which was changed from AWARE to Eckenfelder and the amount of money to be spent is now \$2 Million.

By the way, GAF Chemicals will be paying a penalty of \$308,000 in connection with settling the matters associated with the ACO. Other recipients of this letter should note that if you receive a press contact regarding this ACO you should refer the person to Novotny & Associates, Mr. E. Ryan (212) 902-5400.

If there are further questions, please contact me.

Sincerely,

W.E. Chambers,
Managing Director
Environmental, Product &
Employee Safety

WEC/ju
attachment

cc: S. Block
A. Lindenauer
A. Carlin
A. ten Braak

ML-WEC:35

An equal opportunity employer

RECEIVED

JUN 5 1989

H. F. MCCARTHY



State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

CN 029

Trenton, N.J. 08625-0029

Jorge H. Berkowitz, Ph.D.
Acting Director

(609) 292-1637
Fax # (609) 954-7958

IN THE MATTER OF	:	ADMINISTRATIVE
GAF CHEMICALS CORPORATION	:	CONSENT
LINDEN\UNION COUNTY	:	ORDER

This Administrative Consent Order is entered into pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "NJDEP" or "Department") by N.J.S.A. 13:1D-1 et seq., and the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and duly delegated to the Assistant Director of the Division of Water Resources (DWR) pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1. GAF Chemicals Corporation (hereinafter "GAF") operates a facility (hereinafter "facility") located on DuPont Road, Block 587, Lot 1, Linden, Union County, New Jersey.
2. On December 30, 1985, NJDEP issued to GAF NJPDES Permit No. NJ0000019 (hereinafter "the Permit") effective February 1, 1986 and scheduled to expire January 31, 1991. The Permit authorized the discharge of pollutants from the facility to the Arthur Kill, a surface water of the State.
3. By letter dated February 6, 1986, the Department modified the effective date of the Permit to March 1, 1986.
4. Part IV, Pages 14 - 15 of the Permit requires that the discharge from Discharge 001 meet a limitation of no less than an LC50 of 20% (by volume) beginning February 1, 1988, and no less than an LC50 of 50% (by volume) beginning August 1, 1989 for Acute Toxicity.
5. A review of Acute Toxicity test reports submitted to the Department by GAF revealed that results at Discharge 001 for the following tests did not

meet the minimum limitation of LC50 \geq 20% percent (by volume) in violation of the Permit:

<u>Bioassay Test Date</u>	<u>Permit Limitation</u>	<u>Test Results</u>
12\88	LC50 \geq 20% (by volume)	LC50 = 3.9% effluent
1\89	LC50 \geq 20% (by volume)	LC50 = 1.0% effluent
2\89	LC50 \geq 20% (by volume)	LC50 = 2.9% effluent
3\89	LC50 \geq 20% (by volume)	LC50 = 1.3% effluent

LC50 - Concentration of effluent resulting in 50% mortality of organisms tested.

6. GAF has informed the Department that it will require a period of one (1) year and eleven (11) months from April 1, 1989 to meet the final effluent limitations for Acute Toxicity set forth in the Permit.

7. Based upon these findings, the Department has determined that GAF has violated the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., specifically N.J.S.A. 58:10A-6, and the regulations promulgated pursuant thereto, N.J.A.C. 7:14A-1 et seq., specifically N.J.A.C. 7:14A-1.2(c).

8. Based upon the information available to the parties on the effective date of this Administrative Consent Order and to amicably resolve the above matter, the Department and GAF enter into this Administrative Consent Order without trial or adjudication of any of the facts or issues contained herein.

ORDER

NOW, THEREFORE, IT IS HEREBY ORDERED AND AGREED THAT:

I. Enforcement Compliance Schedule

9. GAF shall meet the final effluent limitation for Acute Toxicity at Discharge 001 set forth in Part IV, Pages 14 - 15 of the Permit by March 4, 1991. GAF shall achieve compliance in accordance with the following schedule:

	<u>STARTING DATE</u>	<u>COMPLETION DATE</u>
Design:	April 1, 1989	July 10, 1989

Permitting Process:	June 5, 1989	October 23, 1989
Purchasing:	August 28, 1989	June 4, 1990
Construction and Start-up:	February 5, 1990	March 4, 1991

II. Progress Reports

10. GAF shall submit to the Department quarterly progress reports; the quarters being January through March, April through June, July through September, and October through December of each calendar year. Each progress report shall be submitted on or before the 30th day of the month following the quarter being reported. GAF shall submit the first progress report to the Department by July 31, 1989, for the second 1989 quarter. Each progress report shall detail the status of GAF's compliance with this Administrative Consent Order and shall include the following:

- a. Identification of site and reference to this Administrative Consent Order;
- b. Status of work at the site and progress to date;
- c. Difficulties or problems encountered during the reporting period;
- d. Actions taken or to be taken to rectify difficulties or problems;
- e. Activities planned for the next reporting period;
- f. A discussion of performance evaluation of all corrective remedial measures implemented to date.

III. Penalties

11. Within thirty (30) calendar days after the effective date of this Administrative Consent Order, GAF shall submit a cashier's or certified check in the amount of \$308,000 payable to "Treasurer, State of New Jersey", in settlement of violations noted in the FINDINGS section above to the address given in Paragraph 16 of this Administrative Consent Order.

12. GAF shall pay stipulated penalties to the Department for its failure to comply with the provisions of this Administrative Consent Order according to the following schedule, unless the Department has notified GAF in writing of modifications pursuant to the force majeure provisions hereinbelow:

For schedule violations:

Calendar Days After Due Date

1 - 7	\$ 1000 per calendar day
8 - 14	2000 per calendar day
15 or more	5000 per calendar day

Within fourteen (14) calendar days after receipt of a written demand from the Department, GAF shall submit a cashier's or certified check payable to "Treasurer, State of New Jersey" in the amount of stipulated penalties demanded by the Department. Payment shall be submitted to the address given in Paragraph 16 of this Administrative Consent Order.

13. If GAF fails to pay stipulated penalties pursuant to the preceding paragraph, the Department may institute civil proceedings to collect such penalties or assess civil administrative penalties for violations of this Administrative Consent Order or take any other appropriate enforcement action.

IV. Force Majeure

14. If any event occurs which GAF believes will or may cause delay in the achievement of any provision of this Administrative Consent Order, GAF shall notify the Department in writing within seven (7) calendar days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length of the delay, the precise cause of the delay, any measures taken or to be taken to minimize the delay, and the time required to take any such measures to minimize the delay. GAF shall take all necessary action to prevent or minimize any such delay.

15. If the Department finds that: (a) GAF has complied with the notice requirements of the preceding paragraph and; (b) that any delay or anticipated delay has been or will be caused by fire, flood, riot, strike, or any other circumstances beyond the control of GAF, the Department shall extend the time for performance hereunder for a period no longer than the delay resulting from such circumstances. If the Department determines that either GAF has not complied with the notice requirements of this paragraph or the event causing the delay is not beyond the control of GAF, failure to comply with the provisions of this Administrative Consent Order shall constitute a breach of the requirements of this Administrative Consent Order. The burden of proving that any delay is caused by circumstances beyond the control of GAF and the length of delay attributable to those circumstances shall rest with GAF. Increases in the cost or expenses incurred by GAF in fulfilling the requirements of this Administrative Consent Order shall not be a basis for an extension of time. Delay in an interim requirement shall not automatically justify or excuse delay in the attainment of subsequent requirements.

V. General Provisions

16. GAF shall submit all documents required by this Administrative Consent Order by certified mail, return receipt requested, or by hand delivery with an acknowledgement of receipt form for the Department's signature to:

Mr. Peter T. Lynch, Chief
Metro Bureau of Regional Enforcement
NJDEP - Division of Water Resources
2 Babcock Place
West Orange, NJ 07052

17. GAF shall submit copies of any document required by this Administrative Consent Order to:

Dr. Richard A. Baker, Chief
Permits Administration Branch
Planning and Management Division
USEPA - Region II
26 Federal Plaza
New York, NY 10278

18. All provisions of the Permit shall remain in full force and effect and are not modified by this Administrative Consent Order. The enforcement compliance schedule set forth above in Paragraph 9 of this Administrative Consent Order is an enforcement compliance requirement that GAF shall meet while working to meet the effluent limitations in the Permit. The enforcement compliance requirements of this Administrative Consent Order do not modify any provisions of the Permit or any of the duties or liabilities of GAF thereunder.

19. Nothing in this Administrative Consent Order shall preclude the Department from taking enforcement action against GAF for matters not set forth in the FINDINGS section of this Administrative Consent Order.

20. This Administrative Consent Order shall be binding on GAF, its successors, assigns, and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

21. GAF shall perform all work conducted pursuant to this Administrative Consent Order in accordance with prevailing professional standards.

22. This Administrative Consent Order shall not relieve GAF from obtaining and complying with all applicable federal, state, and local permits, as well as applicable statutes and regulations while carrying out the obligations imposed by this Administrative Consent Order.

23. This Administrative Consent Order shall not preclude the Department from requiring that GAF apply for any permit or permit modifications issued by the Department under the authority of the Water Pollution Control Act

N.J.S.A. 58:10A-1 et seq., and/or any statutory authority for the matters covered herein. The terms and conditions of any such permit shall not be preempted by the terms and conditions of this Administrative Consent Order even if the terms and conditions of any such permit are more stringent than the terms and conditions of this Administrative Consent Order except with respect to the Acute Toxicity Bioassay limitation in any NJPDES Permit issued during the period from the effective date of this Administrative Consent Order to March 4, 1991.

24. All appendices referenced in this Administrative Consent Order, and all reports, work plans, and documents required under the terms of this Administrative Consent Order are, upon approval by the Department, incorporated into this Administrative Consent Order by reference and made a part hereof.

25. Obligations and penalties of this Administrative Consent Order are imposed pursuant to the police powers of the State of New Jersey for the enforcement of law and protection of the public health, safety and welfare and are not intended to constitute debt or debts which may be limited or discharged in a bankruptcy proceeding.

26. In addition to the Department's statutory and regulatory rights to enter and inspect, GAF shall allow the Department and its authorized representatives access to the facility at all times for the purpose of monitoring GAF's compliance with this Administrative Consent Order. Department personnel shall comply with all health and safety requirements applicable to GAF employees.

27. The Department reserves the right to require GAF to take additional actions should the Department determine that such actions are necessary to protect human health or the environment. Nothing in this Administrative Consent Order shall constitute a waiver of any statutory right of the Department to require GAF to undertake such additional measures should the Department determine that such measures are necessary.

28. GAF shall not construe any informal advice, guidance, suggestions, or comments by the Department or by any persons acting on behalf of the Department, as relieving GAF of its obligations to obtain written approvals as may be required herein unless such advice, guidance, suggestions, or comments by the Department shall be submitted in writing to GAF.

29. GAF hereby consents to and agrees to comply with this Administrative Consent Order which shall be fully enforceable as an Order in the New Jersey Superior Court upon the filing of a summary action for compliance pursuant to the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq.

30. GAF hereby agrees not to contest the authority or jurisdiction of the Department to issue this Administrative Consent Order and also agrees not to contest the terms and conditions of this Administrative Consent Order in any action to enforce its provisions.

31. GAF shall give written notice of this Administrative Consent Order to any successor in interest prior to transfer of ownership of the facilities which are the subject of this Administrative Consent Order, and shall simultaneously verify to the Department that such notice has been given.

32. This Administrative Consent Order shall terminate upon receipt by GAF of written notice from the Department that GAF has demonstrated, to the satisfaction of the Department, that all the terms of this Administrative Consent Order have been completed.

33. Hearing Waiver. When this Administrative Consent Order becomes effective, GAF waives its rights to a hearing on the matters contained hereinabove pursuant to N.J.S.A. 52:14B-1 et seq. and N.J.S.A. 58:10A-1 et seq.

34. No modification or waiver of this Administrative Consent Order shall be valid except by written amendment duly executed by GAF and the Department, or by the Department's modification in writing of any of the provisions pursuant to the force majeure provisions hereinabove.

35. This Administrative Consent Order shall take effect upon execution hereof by all parties; provided, however, that this Administrative Consent Order shall be null and void unless the Department receives the fully executed original within seven (7) calendar days of the Department's execution hereof.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY AUTHORITY OF
JORGE H. BERKOWITZ, Ph.D.
ACTING DIRECTOR
DIVISION OF WATER RESOURCES

DATE: MAY 30 1989

BY: [Signature]
JAMES K. HAMILTON
ASSISTANT DIRECTOR
ENFORCEMENT ELEMENT

GAF CHEMICALS CORPORATION

DATE:

BY:

NAME:

TITLE: